

Original articles

Pattern of ocular trauma in the Western Region of Nepal

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Abstract

Introduction: Ocular trauma is an important cause of unilateral blindness.

Objective: To determine the characteristics and visual outcome of ocular trauma in the western region of Nepal.

Materials and methods: All cases of ocular trauma presenting in a one-year period to the Himalaya Eye Hospital were retrospectively reviewed. The demographic features, type and cause of trauma, time lapse before presenting to the hospital, management and results were noted.

Results: Eleven hundred eyes of 1,069 patients (31 bilateral injuries) were included in this study. Males were predominantly affected (69.3 %) compared to their female counterparts. The average age of the patients presenting with trauma was 28.3 years. On reviewing the causes of trauma, blunt trauma which accounted for 56.5 % was the commonest of all, followed by sharp injury accounting for 16.7 %. The commonest type of trauma was closed globe injury (73.3 %). The visual outcome was poorer in open globe injury as compared to closed globe injury. Of the total cases, only 52.9 % presented to the hospital within 24 hours. Over 7 % of them presented as late as one week. Among these patients, 74.8 % of them had regained normal vision (6/18) and 8 % of the total became blind (<3/60) according to the WHO criteria.

Conclusion: Males are more prone to ocular trauma than the females. Open globe injury and late presentation are probably the worst prognostic factors for the visual outcome. There is a need of educating the community regarding the importance of seeking immediate medical care after ocular trauma in a country like Nepal.

Key-words: ocular trauma, blindness, Nepal

Introduction

Worldwide, blindness in 1.6 million people is due to ocular trauma, 2.3 million are bilateral low-vision patients and 19 million people have unilateral blindness (Negrel & Thylefors, 1998). Ocular trauma is becoming relatively more important, especially in developing countries. Thylefors (1992) reported that trauma of the eye is the most impor-

tant cause of unilateral loss of vision in developing countries and 5 % of all bilateral blindness is directly due to trauma. In Nepal, ocular trauma is considered a major cause of unilateral blindness. It is the second leading cause of blindness after cataract. An estimated 7.9 % of all blindness in Nepal is caused by ocular trauma (Brilliant et al, 1985). Although the eye represents only 0.3 % of the total body surface area, loss of vision in one or both eyes has been classified as a 24 % or 85 % whole person impairment, or disability, respectively (Brant &

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Haug, 2001). In addition to the impact on affected individuals, there are also profound social implications regarding the lost productivity by young men (MacEwen, 1999) since they have a relatively high risk at ocular trauma (Glynn et al, 1988; Desai et al, 1996; Parmar et al, 1985; Chapella & Rosenthal, 1985). The impact of loss of sight on the daily life, the need for medical care, the loss of income, and the cost of rehabilitation, makes it worth to look at preventive strategies (Thylefors, 1992). It is believed that over 90 % of all eye injuries can be prevented, making ocular trauma one of the most important preventable causes of blindness (Parver, 1986; Whitcher et al, 2001; Parver et al, 1993). To prevent eye injuries and to develop effective treatments an adequate data is essential. Therefore we performed this study in western region of Nepal, where a similar research has not taken place before.

Materials and methods

This is a retrospective hospital-based study. Of all patients the medical records and consultation charts were retrieved and data extracted included demographic information, date of injury, time to arrival in hospital, mechanism of trauma, type of trauma, visual acuity at presentation, type of treatment received, complications and visual outcome.

To describe the type of trauma we used the definitions and classifications of ocular trauma from the Birmingham Eye Trauma Terminology System (BETT) [Kuhn et al, 1996; Kuhn et al, 2004]. We added two extra categories, orbital trauma and burns, following the example of Lee et al (2008) in their study on pediatric ocular trauma. In closed globe injury we added a category of superficial foreign bodies, for patients with a clear history of

trauma, but with only a foreign body as the diagnosis. Visual acuity was determined by a Snellen, tumbling 'E' or picture chart. To describe the visual acuity at presentation and follow-up we applied the WHO classification on visual impairment and blindness, shown in Appendix 3. Visual outcome was defined as the last visual acuity recorded, with the exception of visual acuity measured at presentation.

Inclusion criteria

All patients presenting with ocular trauma for the first time during a 12-month period (August 2008 - July 2009) were included in this study. Ocular trauma was defined as any injury affecting the eye or adnexa, caused by an external force. Cases of foreign bodies were only included when they entered the eye with force.

Exclusion criteria

Patients presenting with a superficial foreign body blown into the eye because of wind were excluded.

Statistics: We used SPSS version 17.0 for our statistical analyses. All p-values less than 0.05 were considered statistically significant.

Results

There were 1100 injured eyes in 1069 patients over the one-year period, of which thirty-one patients (2.9 %) sustained bilateral trauma. The average age of patients with ocular trauma was 28.28 ± 18.29 years (range = 1 year - 87 years) for both male and female. Males were more prone to ocular trauma accounting 741 (69.3 %) than females 328 (30.1 %), ($p < 0.001$; chi-square-test) and making the male to female ratio of 2.3:1.

Table 1

Agents of ocular trauma

Blunt objects n=604 (56.5 %)	Sharp objects n=178 (16.7 %)	Projectiles n=162 (15.2 %)	Burns n=112, (10.5 %)	Bites n=13 (1.2 %)
Stick 36.6 %	Plant 52.2 %	Iron particles 71.6 %	Chemical 69.6 %	Bird 46.2 %
Hand/fist/fingers 21.5 %	Pens 14.7 %	Stone particles 18.5 %	Thermal 30.3 %	Dog 23.1 %
Stone 8.8 %	Nails 9.0 %	Gun powder 4.3 %		Leech 30.8 %
Fall down 7.3 %	Glass 5.1 %	Wood particle 3.7 %		
RTA 5.0 %	Knives 2.8 %			
Buffalo/goat/ cow horn 3.8 %	Miscellaneous 15 %			
Miscellaneous 14 %				

Table 2
Type of trauma

Closed globe injury n=784 (73.3 %)	Orbital injury n=116 (10.9 %)	Burn injury n=112, (10.5 %)	Open globe injury n=57 (5.3 %)
Contusion n=374 (47.7 %)	Ecchymosis n=78 (67.2 %)	Chemical burn n=78 (69.6 %)	Laceration n=31 (34.4 %)
Lamellar laceration n=228 (29.1 %)	Lid laceration without canalicular involvement n=31 (26.7 %)	Thermal burn n=34 (30.4 %)	Penetrating n=29 (93.5 %)
Foreign body n=182 (23.2 %)	Lid laceration with canalicular involvement n=4 (3.4 %)		Rupture n=26 (45.6 %)
	Orbital fractures n=3 (2.6 %)		IOFB n=2 (6.5 %)

Table 3
Visual acuity at presentation in different types of trauma

Visual acuity at presentation	Type of trauma				Total
	Closed globe n (%)	Open globe n (%)	Burn n (%)	Orbital trauma n (%)	
WHO cat 0	651(84.2)	4(7.5)	65(61.3)	94(83.9)	814(78.0)
WHO cat 1	52(6.7)	10(18.9)	27(25.5)	6(5.4)	95(9.1)
WHO cat 2	5(0.6)	0(0)	4(3.8)	1(0.9)	10(1.0)
WHO cat 3	15(1.9)	9(17.0)	3(2.8)	0(0)	27(2.6)
WHO cat 4	12(1.6)	17(32.1)	0(0)	1(0.9)	30(2.9)
WHO cat 5	2(0.3)	9(17.0)	0(0)	0(0)	11(1.1)
CSM	36(4.7)	4(7.5)	7(6.6)	10(8.9)	57(5.5)
Total	773	53	106	112	1044

Of all patients presenting with ocular trauma, 814 patients (78.0 %) had a good visual acuity of at least 6/18, as shown in Table 3. Sixty-eight patients (6.5 %) met the criteria of blindness set by the WHO. There was a significant difference in the visual acuity at presentation between open globe injuries and closed globe, burn, and orbital injuries ($p < 0.001$; ANOVA with Tukey post-hoc test). Open globe injuries had the worst visual acuity at presentation, with only 7.5 percent having a visual acuity of at least 6/18. Closed globe injuries had a visual acuity of at least 6/18 in 84.2% of cases.

Complications

Of the 411 patients showing up for follow-up, five were referred to a higher hospital.

In total three patients developed endophthalmitis. One patient developed endophthalmitis following a sealed ruptured globe caused by a stone and the other one after cataract extraction for traumatic cataract. Four patients (one open globe injury, three closed globe injuries) developed traumatic iridocyclitis. They all recovered well with antibiotics and

had full vision at follow-up. Seven patients of closed globe injury developed traumatic cataract. One developed traumatic angle recession glaucoma in the closed globe injury.

Discussion

Most ocular trauma was caused by blunt objects, similar to previous studies (Desai et al, 1996; Saari & Aine, 1984; Zaglbaum et al, 1984). Sticks being the most common object. This could be attributed to the fact that agriculture is the main profession of the people living in these areas. It could also explain the sharp traumas caused by grass tips and bamboo and the blunt traumas caused by buffalo/cow/goat horns. The reported 162 projectiles, of which 116 were iron and 30 were stone particles, could be work-related too. In Nepal, people work as 'stone-cutters', for which metal hammers are used to shape stones. When hammering on stone projectiles or metal parts from the hammer can hit the eye with great force.

Almost seventy percent of all burns were caused by chemicals and almost a quarter of all chemical



burns were caused by instillation of Vicks-menthol into the eye. This remarkably high percentage of Vicks-menthol instillation is due to the similarity of the appearance of the tubes that contain chloramphenicol eye-ointment and the tubes that contain Vicks-menthol.

A very large proportion of patients with ocular trauma (48.1 %) showed a delay of more than 24 hours before arriving at hospital. This percentage is ten percent higher than Zagebaum et al (1984) found in his study on urban eye trauma and even thirty-six percent higher than in a study by Soliman in Egypt (Soliman & Macky, 2008). In our study, more than seven percent of patients with ocular trauma waited for more than one week before seeking help. Since the majority of people residing in Pokhara and surroundings are poor, economic factors might have influenced their decision to wait for things to get better. Treatment at hospital not only costs money, but also requires a day off from work, making the burden even higher. The majority of patients with ocular burns and more severe trauma however reported within 24 hours. In these groups, pain might have been a stronger motivation than economic factors for seeking help. Delay in presentation of more than 24 hours and especially more than one week caused a significant worse visual outcome. The population will need to be educated about the possible consequences of ocular injuries and delay in presentation at hospital. They need to be instructed to come to hospital as soon as possible after the trauma occurs, to prevent any worsening of eye sight.

Limitation of the study

Because of lacking of good documentation of other important variables, like profession and whether the accident was work-, sports-, location-, drug/alcohol- or assault-related, we could not identify these as risk factors for eye trauma.

Conclusion

The majority of eye trauma occurred in males in western region of Nepal. We could depict that a

few variables (age, delay in presentation, open globe injuries) predicted bad visual outcome following ocular trauma. By educating the population about the importance of coming to hospital immediately after ocular trauma we can end the delay in presentation-time. For future research the missing variables mentioned should be (better) recorded to be able to identify more risk factors for ocular trauma and predictors of bad visual outcome, which is essential to enable prevention.

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