

Etiological Characteristics and Treatment Outcomes of Eye Lid Laceration: A Hospital Based Prospective Study

Thapa BB, Gurung NK

ABSTRACT

Introduction: Lid laceration is a very common peri-ocular trauma. Regarding the etiology and treatment, it lacks studies in developing nations including Nepal. **Aims:** To assess the etiological characteristics and treatment outcomes of eyelid laceration. **Methods:** In this study, 47 cases of traumatic eyelid laceration were consecutively studied and its epidemiology, etiology and treatment outcome were evaluated. **Results:** The 47 patients were included in the study. The mean age of study population was 26.14 ± 18.02 years. Male: female ratio was 1.6:1. The trauma occurred on road in 34 (72.3%) cases, followed by at home (14.9%), at work place (8.5%) and at entertainment areas (4.2%). The most common mode of injury was road traffic accident (72.3%) followed by fall injury (17%), Physical assault (6.4%) and animal bite (4.3%). The 68.1% of had isolated lid laceration, 12.7% had other adnexal injuries and 10.6% had globe injuries, 8.5% had other facial injuries and only 4.1% had systemic trauma. The partial thickness laceration was observed on 42(89.4%) cases and full thickness laceration on 5 (10.6%) cases. The length of lid laceration ranged from 4- 45 mm (mean \pm SD was 14.7 ± 8.3 mm). The 14.9% cases had canalicular laceration. The 85% of the laceration healed without visible scar. Only 4 patients (8.5%) had thick hypertrophic scar. The visual function was intact in 44 patients whereas impaired in 3 patients with accompanying open globe injury. The complications noted were hypertrophic scar (8.6%), wound infection (2.1%), ectropion (2.1%), corneal opacity (2.1%) and phthisis bulbi (2.1%). **Conclusion:** This study highlights the high-risk people and work place for eyelid laceration and the safety precautions in dangerous settings, including daily and routine work places. Only accompanying open globe injury can damage visual function.

Keywords: Etiology, Lid laceration, treatment outcomes

Authors:

1. Dr. Bikram Bahadur Thapa
2. Prof. Nanda Kumari Gurung

Department of Ophthalmology, Nepalgunj Medical College and Teaching Hospital, Nepalgunj, Banke

Address for Correspondence:

Dr. Bikram Bahadur Thapa
Assistant Professor
Department of Ophthalmology
Nepalgunj Medical College and Teaching Hospital
Nepalgunj, Banke
Email: drbbthapa@gmail.com

INTRODUCTION

Eye lid may be affected by trauma along with the involvement of head and face.¹ The documented causes of lid injury are fall, furniture, animal bite, toys, road traffic accident, sport, blunt trauma, physical assault, outdoor injury, pencil and kitchen equipment.² There is lack of consensus and studies on the epidemiological characteristics of lid laceration in the developing nations including Nepal.³ The effective prevention and management can be obtained with the improved knowledge of the etiology, demographics, causes, and clinical features.⁴ Knowing this to be one of the preventable health issues commonly seen, it is important to address this issue in order to reduce its impact on the socioeconomics of the community.⁵ Knowledge regarding the causes of eye lid lacerations can help to develop better preventive strategy and hence improve the public health policy in this respect.

The lid lacerations are found to be repaired using 6-0 silk, 7-0

vicryl and 6-0 chromic catgut suture in interrupted fashion.⁶ We choose 6-0 vicryl and 8-0 vicryl suture in interrupted fashion for the better cosmetic result, sufficient wound strength and suture resorption which remove the need of suture removal.⁶ There are many techniques of eyelid repair depending upon the type of wound. This study aimed to identify the high-risk population, to determine etiological causes and to detect outcome measures of lid laceration at western part of Nepal. Thus, it will help to facilitate the development of a preventive strategy to reduce the prevalence of it in high -risk population.

METHODS

Between January 2019 and September 2020, patients with lid laceration attending the emergency and ophthalmology department of Nepalgunj Medical College, Nepalgunj were consecutively enrolled in this prospective hospital based study. The ethical approval for this study was obtained from Institutional Review Committee of Nepalgunj medical college.

Patients with trauma to the eye lids causing lid laceration were included in the study. The demographic data and other clinical findings were documented in the proforma. Each patient was evaluated and managed by an Ophthalmologist. Informed consent was obtained from each patient or parent in case of minor on enrollment in the study.

The inclusion criteria were consisted of; any traumatic laceration involving lids or its margins that underwent lid repair by direct closure technique. Patients with emergent conditions needing intensive care and cases repaired with other technique were excluded. Lid laceration was defined as any trauma to the external surface of the lids with or without evident loss of tissue.⁷ The other injury associated were also recorded and referred to the respective specialties for management. The size and depth of laceration was noted. Involvement of canaliculus and eye lid margin was also noted. All patients were screened for hyperglycemia, HIV and HBsAg and HCV serology.

Foreign bodies in the wound and devitalized tissues were removed with through wound exploration and cleaning with ringer lactate with the help of forceps and scissors. Each patient underwent primary lid repair by direct closure technique using 8-0 vicryl or 6-0 vicryl suture in layers as per the depth of laceration. In case of canalicular involvement silastic tube was intubated to maintain the patency. In case of lid margin involvement, margin was repaired first with two 6-0 vicryl sutures. The outcomes were measured on 1 month follow up visit. The outcome measures were visual acuity, anatomical success, scar character and complications.

Data were analyzed using the Statistical Package for Social Service version 16 (SPSS, Chicago, Inc). The results were presented as number, percentage, range and mean±Standard deviation. The unpaired t test was used to compare the mean values in preoperative and postoperative visual acuity. The Pearson's test was applied to see the correlation of various preoperative factors which can predict the visual outcome. A P-value less than 0.05 was considered statistically significant.

RESULTS

This study enrolled 47 patients with 13 (27.7%) females and 34 (72.3%) males aged between 1 and 65 years old (mean: 26.14 ± 18.02 years). The male: female ratio is 1.6:1. Most of the patients were resident of Banke district (44.7%) and Lumbini province (63.8%). All of the studied patients were conscious at the time of hospital admission (GCS=15/15). Among the study participants, 17 (36.2%) were students, 13 (27.7%) were farmers, 8 (17%) were Shopkeepers, 2 (4.3%) were driver and rest were from other occupation or unemployed and not subjected to any form of occupation. In terms of the place of trauma, the incident occurred on road as traffic accident in 34 cases (72.3%), followed by 7 cases (14.9%) reported to have occurred at home, 4 (8.5%) participants reported the incident to have occurred at the workplace, 2 cases (4.2%) happened at entertainment areas due to assault. The most common mode

of injury detected in this study was road traffic accident (72.3%) followed by fall injury (17%), Physical assault (6.4%)

and animal bite (4.3%).The demographic profile of study population is depicted on table I.

Age (years)	Frequency	Percentage (%)	Mean ± SD	Range
0-10	8	17.0		
11-20	11	23.4		
21-30	10	21.3		
31-40	7	14.9	26.14 ± 18.02	1-65 years
41-50	4	8.5		
51-60	4	8.5		
> 60	3	6.4		
Gender			M: F ratio	
Male	34	72.3	1.6:1	
Female	13	27.7		
Occupation				
Farmer	13	27.7		
Student	17	36.2		
Shopkeeper	8	17		
Driver	2	4.3		
Teacher	1	2.1		
Health Worker	1	2.1		
Children	5	10.6		
Mode of Injury				
Road traffic accident	34	72.3		
Fall injury	8	17		
Physical assault	3	6.4		
Animal bite	2	4.3		

Table I: Demographic profile of cases

On complete evaluation regarding associated other injuries; 68.1% of patients had isolated lid laceration. 12.7% had other adnexal injuries and 10.6% had globe injuries, 8.5% had other facial injuries and only 4.1% had systemic trauma. The right eye both eyelids were involved in 10 cases (21.3%), the left lower eyelid, right upper eyelid and right lower eyelid were affected equivalently involving 8 (17.0%) patients in each group. Involvement of left upper eyelid and left both eyelids were reported in 6 cases (12.8 %), while bilateral eyelid injury was detected in one case (2.1%).In this study 65 eyelid of 47 patients were affected. The length of lid laceration ranged from 4- 45 mm (mean ± SD =14.7±8.3 mm). Depth of laceration was divided into 2 categories: full thickness and partial thickness. Most of patients in our study had partial thickness laceration (figure 1 A & B) accounting 42 cases (89.4%) and only 5 cases (10.6%) had full thickness laceration (figure 2). Out of 47 victims of lid laceration, 7 cases (14.9%) were detected to have canalicular laceration (figure 2) and were managed with canalicular intubation along with primary repair. These clinical characteristics are shown in table II.

Depth of laceration	Frequency	Percentage
Partial thickness	42	89.6
Full thickness	5	10.6
Length of laceration		
mean ±SD		14.7±8.3 mm
Range		4-45 mm
Canalicular involvement		
Canalicular laceration	7	14.9
No canalicular laceration	40	85.1
Injured Lid		
Right both lid	10	21.3
Left both lid	6	12.8
Right upper lid	8	17
Left upper lid	8	17
Right lower lid	8	17
Left lower lid	6	12.8
Left both lid and right lower lid	1	2.1
Associated other injuries		
open globe injury	3	6.4
closed globe injury	2	4.3
adnexal injury	5	10.6
facial injury	4	8.5
systemic injury below face	2	4.3

Table II: Clinical characteristics of study population



Figure 1: A) Preoperative and B) post operative photograph of left partial thickness lid laceration

The cause of VA<3/60, in 5 patients on postoperative day includes corneal edema in two eyes, glaucomatous optic atrophy in one eye, advanced diabetic eye disease in one eye and optic atrophy in one eye.



Figure 2: Intraoperative photograph of a right lower lid full thickness laceration with canalicular involvement

Most commonly used suture for lid repair was 6-0 vicryl which was used in 35 patients (74.5%), whereas 8-0 vicryl was used in 9 patients (19.1%) and both types of sutures were used in 3 patients (6.4%). The associated open globe injury involving cornea in 1 patient was repaired with 10-0 nylon suture. Almost 85.1% of the laceration healed without visible scar in the lid while 14.9% develops visible scar. Only 4 patients (8.5%) had thick hypertrophic scar which were treated with hyaluronidase cream once a day application or surgical scar excision. The visual function was not affected in 44 patients. Three patients with accompanying globe injury had reduced visual acuity including No perception of light in one eye. The presenting and final visual acuity observed significantly low in patients with OGI (p=0.00) but not with CGI (p=0.42) and with depth of laceration (0.069) on pearson test. The various complications noted were hypertrophic scar (8.5%), wound infection (2.1%), ectropion (2.1% Figure: 3), corneal opacity (4.3%) and phthisis bulbi (2.1%). The hypertrophic scar and ectropion were treated by scar excision and autologous free skin graft with good outcome. The treatment outcomes are tabulated on table III.

Anatomical outcome	Frequency	Percentage
Healing without visible scar	40	85.1
Visible scar	3	6.4
Hypertrophic scar	4	8.5
Complications		
Hypertrophic scar	4	8.5
Ectropion	1	2.1
wound infection	1	2.1
Phthisis bulbi	1	2.1
corneal opacity	2	4.3
Visual Outcome		
Preoperative Mean Logmar VA± SD=	0.47±0.82	
Postoperative Mean Logmar VA± SD=	0.41±0.81	

Table III: Treatment outcomes of lid laceration repair



Figure 3: Right lower lid ectropion with thick visible scar on post operative follow up in a case of lid laceration

DISCUSSION

To our knowledge, we noted not a single study which was methodologically well designed which examined the epidemiology of eyelid laceration or at least has organized the population-based findings; thus, it would appear that such injury alone is not a matter of serious concern to the public health community in Nepal. This study observed a greater prevalence for eyelid lacerations among male patients (72.3%) of active age i.e., (mean: 26.14 ± 18.02 years in our society) as shown by other studies.⁷⁻¹¹ This could be due to the fact that men tend to have risk taking behavior, occupy higher risk jobs, and are also involved in activities such as; operating motor vehicle with less safety and immunity and practicing vigorous sports. Men are also implicated in a higher rate of assaults or other violent crimes, and they even exhibit a lack of concepts of safety and caution at the work place. However, attention should be paid to the changing position of women's roles outdoors and the subsequent alteration in predisposition of high-risk conditions and related injuries.¹²⁻¹⁴ Most of affected individual in present study were students and farmer. This is totally inconsistent with other reports, in which ocular trauma was shown to be more prevalent among factory worker, housekeeper and labourer.^{7,10} This difference might be due to different social and cultural backgrounds.

The study results revealed that the most common places where accidents occurred were the road followed by home and workplace in contrast to the findings of other study where workplace was the most common place of trauma.^{7,8,11} This might be due to lack of awareness and avoidance of traffic rules. Thus, more awareness program and strict implementation of traffic rule is recommended to government authority. The work place trauma can be reduced by use of safety goggles.

Motor vehicle accidents, falling, fighting and animal bite were the main causes of lid lacerations in this study population. Motor vehicle accident was the most common etiology of lid laceration in the current study similar to Schein et al¹⁵ who reported moving objects with blunt features to be the most common etiology. Motor cycle riders were the most of RTA patients in this study which was also shown by Tabatabaei et al⁷ in Iran. In Nepal, the mode of transportation is mostly on

motorcycles but people tend not to use safety apparatus such as helmet.

The mean length of laceration was 14.7 mm in this study which is shorter than the laceration length reported by Tabatabaei et al⁷ (19.2mm). Only 10% of cases had full thickness lid laceration in this study. The canalicular injury was reported in 7 (15%) cases in this study which is not detected in the report of Tabatabaei et al⁷ suggesting more severe injury at our setting. Mechanical globe injury was observed in 5 cases (10.6%) in our study which is higher proportion on comparing the report of Tabatabaei et al⁷. The 3 cases were open globe injury whereas 2 cases were closed globe injury. The presenting and final visual acuity observed significantly low in patients with OGI ($p=0.00$) but not with CGI ($p=0.42$) and depth of laceration ($p=0.069$). Thus, concomitant OGI is the only observed important predictor of poor presenting and final visual acuity in this study which was also shown by other studies.^{7,16} Among lid lacerations in the current study, only 1 case developed wound infection as noted in previous studies.^{17,18}

LIMITATIONS

The limitations of the study include the small sample size, single-center study and non-randomized nature.

CONCLUSION

This study highlights the high-risk people and work place for eyelid laceration and the safety precautions (use of safety goggles and helmet) in dangerous settings, including work places. Only accompanying open globe injury can damage visual function.

REFERENCES

1. Bert F, Ouahes O, Lambert-Zechovsky N. Brain abscess due to *Bacillus macerans* following a penetrating periorbital injury. *J Clin Microbiol* 1995; 33:1950-53.
2. Sadiq M.A.A., Corkin F, Mantagosl. S.Eyelid Lacerations Due to Dog Bite in Children. *J Pediatr Ophthalmol Strabismus*. 2015; 52:360- 63.
3. Tielsch J. Frequency and consequences of ocular trauma: a population perspective. *Ophthalmol Clinics North Am*. 1995;8: 559-67.
4. Cillino S, Casuccio A, Di Pace F, Pillitteri F, Cillino G. A five-year retrospective study of the epidemiological characteristics and visual outcomes of patients hospitalized for ocular trauma in a Mediterranean area. *BMC Ophthalmol* 2008; 8:6.1-9 doi: 10.1186/1471-2415-8-6
5. Négre AD, Thylefors B. The global impact of eye injuries. *Ophthalmic Epidemiol* 1998; 5:143-169.
6. Martin H. Devoto, Robert C. Kersten, Scott A. Teske, Dwight R. Kulwin, Cincinnati, Ohio. Simplified Technique for Eyelid Margin Repair. *Arch Ophthalmol*.1997;115:566-7.
7. Tabatabaei A, Kasaei A, Nikdel M, Shoar S, Esmaeili S, Mafi M, Moradi M, Mansouri M, Eshraghi B, Tabatabaei Z. Clinical characteristics and causality of eye lid laceration in iran. *Oman Med J*. 2013; 28:97-101.

8. Wong TY, Klein BE, Klein R. The prevalence and 5-year incidence of ocular trauma. The Beaver Dam Eye Study. *Ophthalmology* 2000; 107:2196- 2202.
9. Glynn RJ, Seddon JM, Berlin BM. The incidence of eye injuries in New England adults. *Arch Ophthalmol* 1988; 106:785-89.
10. Dandona L, Dandona R, Srinivas M, John RK, McCarty CA, Rao GN. Ocular trauma in an urban population in southern India: the Andhra Pradesh Eye Disease Study. *Clin Experiment Ophthalmol* 2000; 28:350-56.
11. McCarty CA, Fu CL, Taylor HR. Epidemiology of ocular trauma in Australia. *Ophthalmology* 1999; 106:1847-52.
12. Tielsch JM, Parver L, Shankar B. Time trends in the incidence of hospitalized ocular trauma. *Arch Ophthalmol* 1989; 107:519-23.
13. Karlson TA, Klein BE. The incidence of acute hospital-treated eye injuries. *Arch Ophthalmol* 1986; 104:1473-76.
14. Klopfer J, Tielsch JM, Vitale S, See LC, Canner JK. Ocular trauma in the United States. Eye injuries resulting in hospitalization, 1984 through 1987. *Arch Ophthalmol* 1992; 110:838-42.
15. Schein OD, Hibberd PL, Shingleton BJ, Kunzweiler T, Frambach DA, Seddon JM, et al. The spectrum and burden of ocular injury. *Ophthalmology* 1988; 95:300-05.
16. Sternberg P Jr, de Juan E Jr, Michels RG, Auer C. Multivariate analysis of prognostic factors in penetrating ocular injuries. *Am J Ophthalmol* 1984; 98:467-72.
17. Thompson WS, Rubsamen PE, Flynn HW Jr, Schiffman J, Cousins SW. Endophthalmitis after penetrating trauma. Risk factors and visual acuity outcomes. *Ophthalmology* 1995; 102:1696-1701.
18. Schmidseeder E, Miño de Kaspar H, Klauss V, Kampik A. Post-traumatic endophthalmitis after penetrating eye injuries. Risk factors, microbiological diagnosis and functional outcome. *Ophthalmologie* 1998; 95:153-57.