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Original research article

A clinical study of eyelid injuries and their management

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Abstract

Background and Objectives: Sight is the most cared for function of the human and nature has provided lids to cover the eye to protect it and injuries of eyelids are on rise because of road traffic accidents. The study was conducted to study the types of eyelid injuries, mode of impact in these lid injuries, role of Road traffic accidents in lid injuries and management of these injuries.

Methods: The study was conducted in the Department of Ophthalmology at Maheshwara Medical College & Hospital from July 2020 to July 2022 on 80 cases of eyelid injuries without retained IOFB were included in the study. Cases were examined thoroughly and treated according to the protocol and follow up visits were done accordingly.

Results: Our study showed that, 52.5% patients were male and 47.5% were females with male: female of 1.8: 1 and most individuals were under 4th decade were the commonly involved age group with 31.25% cases. Trauma with metal wire and RTA were leading causes with 23.75% and 15% cases respectively. Women were injured commonly due to domestic activities and outdoor games were the dominant cause of injury in children of < 10 yrs. partial thickness lacerations were commonest types with 21.25% cases. 32.5% cases were treated with 6.0 Vicryl followed by combined with canalicular tear repair with Minimonoka stent and Canalicular tear repair with 24G Venflon were with 22.25%, 16.25% respectively.

Conclusion: The results of this study provide a series of high risk conditions which would be better avoided and lists a number of factors which could be modified. By distinguishing the individuals already at greater risk of developing eye lid laceration, recommendations could be established to prevent such incidents from occurring and avoid excessive costs and other burdens imposed on our society as a result. This is particularly true in developing countries like India, where drawing attention towards cost-effective expenditure of resources is essential, and this alone may prove to be of great benefit to the nation and its people. The study showed that RTAs are the commonest causes for lid injury with male preponderance and in most active age groups. 6.0 Vicryl, Minimonoka stents and 24G Venflon stent are the best treatment methods with good post-operative results. So protective measures should be implemented strictly to avoid injuries due to RTAs and other occupational injuries.

Keywords: Minimonoka stent, venflon stent, mustardé cheek rotation flap, cutler- beard reconstruction, tenzel flap

Introduction

Eyelids are not only protective curtains in front of eyes but also give shape, beauty to the face [1] and are complex structures designed to protect the globe protect the globe from various external trauma, besides help significantly to the sights appearance. The eyelids help to keep the corneas moist and protect against injury and excessive light, regulating the amount of light reaching the retina. When they are closed, stimulation of visual cortex ceases. The lids are essential for distribution and drainage of the tears [2, 3] Beauty of eyes lies in the perfectly contoured and aligned lids [4, 5]. Eye lid injuries are on the rise and > 40,000 individuals sustaining significant visual impairment on a permanent basis are primarily because of increasing incidence of road traffic accidents, industrial mishaps and intentional assaults on human body [6]. Lacerated wounds of the eyelids are common features of ocular trauma and often occur in isolation without any associated intraocular injuries [7] Eyelid trauma may often appear trivial but can have profound effects on injury associated morbidity. Recovery of full eyelid function and maintenance of the lacrimal apparatus are important considerations when approaching lid trauma [8]. Ocular trauma is a major cause of worldwide visual impairment. This type of injuries can differ from uncomplicated skin abrasions to additional compound cases that have wide tissue loss and underlying fracture of the facial skeleton [9-12]. Revival of full eyelid function and preservation of the lacrimal apparatus are significant deliberations when resembling lid trauma [13-15]. Amid all sites of injury, eyelid laceration appears to be deserted in terms of adequate epidemiological investigations. With a thorough understanding of the causes of eye lid lacerations, it is possible to develop a better preventive strategy and hence improve the public health policy in this respect [16]. Hence the aim of the present study was to understand the type of

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eyelid injury and study management of the injuries.

Materials and Methods

The study was conducted in the Department of Ophthalmology, Maheshwara Medical College &Hospital During the period from July 2020 to July 2022 after getting approval for the study protocol and clearance were obtained from the Ethical Review Committee of the institute to which the two hospitals, where the study was conducted are affiliated. Total of 80 cases reported with blunt as well as penetrating eyelid injuries to Maheswara Medical College & Hospital and were selected for the study. The subjects were selected consequently as and when they present and the data was categorized into aetiology, age, sex, mode of injury, surgical procedures done and analyzed.

Inclusion criteria

All patients with all types of Eye lid injuries, who attended outpatient Department of Opthalmology, Maheshwara Medical College &Hospital**.**

Exclusion criteria

- Penetrating injuries of the globe not involving eyelids.
- Perforating injuries of the orbit not involving lids.
- Globe rupture with intact eyelids.
- Retained intraocular foreign body.

Examination

Careful and detailed examination of both eyes was conducted along with the general physical examination for any other associated injury over any other part of the body, pulse rate and B.P were recorded. Post operatively patients were advised to continue antibiotics for 5days along with NSAIDs and local application of Moxifloxacin eye ointment twice a day for 1 week. Follow up visits were done on Day1, Day7 and after6 weeks. Sutures were removed on 7^{th} day in non-marginal injuries and after 2 weeks in marginal injuries. Minimonoka stent was removed after 2 months.

Results

The present study consists of 80 cases of all types of eyelid injuries who attended outpatient Department and Emergency Department of Maheshwara Medical College & Hospital and from July 2020 to July 2022. Cases with history of trauma involving eyelids, canthal injury, canalicular tear and globe injury with involvement of eyelid were included in the study. The retained intraocular foreign body have been excluded from the study. Penetrating injuries of the globe, perforating injury of the orbit as well as globe rupture with intact eyelids were also excluded from this study.

Age wise distribution of cases

The present study showed that the incidence of eyelid injuries is more common among 30- 39 yr (31.25%) followed by 20 - 29 yr (20%), <10 yr (17.5), 10 – 19 yr (12.51%) respectively. This can be attributed to the fact that there is involvement of more active and occupationally susceptible age group and hence are more vulnerable for the injuries.

Table 1: Age incidence

Age in Years	No. of Cases	Percentage
<10 yrs.	14	17.5%
10 - 19 yrs.	10	12.51%
20 - 29 yrs.	16	20%
30- 39 yrs.	25	31.25%
40 - 49 yrs.	9	11.25%
> 50 yrs.	6	7.5%
Total	80	100%

Sex Wise Incidence of Cases

In the present study males outnumber the females in the occurrence of eyelid injuries. This is because of the preponderance of males in outdoor works including occupational work. This study shows that the incidence of eyelid injuries in males 47.5% (38 cases) in comparison to females 52.5% (42 cases).

Table 2: Sex distribution

Sex	No. of cases	Percentage
Male	42	52.5**%**
Female	38	47.5**%**

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This study shows that in 53.75% (43) of cases right eye is involved in comparison to 36.25% (29) cases with involvement of left eye and there were about 10% (8) cases of bilateral eyelid injuries.

Table 3: Eye Affected

Eye affected	No. of cases	Percentage
RE	43	53.75%
LE	29	36.25%
BE	8	10%

Etiological pattern

This study shows that occupational injuries accounts for 61.25% (49 cases) is the most common cause of eye lid injury this is due to low occupational safety standards at work place followed by travel injury 15% (12 cases), 11.25% (9 cases) were domestic causes and 12.5% (10 cases) were during sports and other activities.

Table 4: Etiological pattern

Activity	No. of cases	Percentage
Travel	12	15%
Occupational	49	61.25%
Domestic	9	11.25%
Sports and other activities	10	12.5%

Mechanism of injury

The present study shows that trauma with metal wire is the most common mode of injury, which accounts for 23.75% (19 cases) followed by 15% (12 cases) due to RTA especially bike riding was the most common activity among them and various kinds of falling was 27.5 (8 fall from height, 7 Self fall, 7 Fall from window cases).

Table 5: Mode or Object of injury

Mode	No. of cases	Percentage
RTA	12	15%
Self-fall	7	8.75%
Bull gore injury	4	5%
Trauma with metal wire	19	23.75%
With piece of mirror	1	1.25%
Hook	4	5%
Stick	6	7.5%
Fist	3	3.75%
Metal rod	3	3.75%
Sand paper	1	1.25%
Battery blast	1	1.25%
Fish hook injury	1	1.25%
Wooden bark	1	1.25%
Fall from height	8	10%
Blouse hook	0	0%
Stone	2	2.5%
Fall from window	7	8.75%
Total	80	100%

Types of laceration

This study shows mostly 21.25% of partial thickness lacerations, left eye upper lid was most commonly involved with the incidence of 15% (12 cases), followed by 13.75% (11 cases) of right eye upper lid involvement and both eye lids were involved in 5% (4 cases). Only right eye was involved in eye lid margin lacerations with 5% (4 cases) upper lid, 2.5% (2 cases) were lower lid but both eye lids of both eyes were reported with the frequency of 5% (2 cases of each eye). Canalicular tear was seen along with other types with the incidence of 2.5% (1 case each of upper & lower canaliculus) of eyelid injuries. Canthal injury was seen in 6 patients of which 5 cases of RE (2 of Medial canthal injury, 3 lateral canthal involvement) and 1 case of LE injury lateral canthal involvement. Full thickness laceration without tissue loss was seen in 10% (8 cases) of which 5were with RE and 3 cases of LE involvement, as well as upper (3cases of RE & 1 case of LE) and lower eyelid (2 cases each). Full thickness laceration with tissue loss of 0-25% was seen in 10% (8 cases) followed by 3.75% of 25-60% of tissue loss and tissue loss of >60% cases were with 6.25% incidence.

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Table 6: Type of Laceration

Type		RE		LE	
		No	**Percentage**	**No**	**Percentage**
Partial thickness	Upper eyelid	11	13.75%	12	15%
	Lower eyelid	5	6.25%	2	2.5%
	Both eyelids	1	1.25%	3	3.75%
Eye lid margin	Upper eyelid	4	5%	0	0%
	Lower eyelid	2	2.5%	0	0%
	Both eyelids	2	2.5%	2	2.5%
Full thickness laceration without tissue loss:	Upper eyelid	3	3.75%	1	1.25%
	Lower eyelid	2	2.5%	2	2.5%
Full thickness laceration with tissue loss A. Tissue loss 0-25%	Upper eyelid	1	1.25%	1	1.25%
	Lower eyelid	3	3.75%	3	3.75%
B. Tissue loss 25-60%	Upper eyelid	0	0%	1	1.25%
	Lower eyelid	1	1.25%	1	1.25%
C. Tissue loss of >6o%	Upper eyelid	0	0%	2	2.5%
	Lower eyelid	3	3.75%	0	0%
*Canalicular tear: A. Monocanalicular	Superior canaliculus	1	1.25%	0	0%
	Inferior canaliculus	1	1.25%	0	0%
B. Bicanalicular		0	0%	0	0%
Canthal injuries	Medial canthal injury	2	2.5%	0	0%
	Lateral canthal	3	3.75%	1	1.25%
	injury				
Total		43	53.75%	29	36.25%

Other structures involved

In this study other structures involved mostly are conjunctiva with the incidence of 10% (8 cases) followed by AC 6.25%, globe rupture and posterior segment were with 5% each. Fracture of zygomatic arch and Fracture of maxillary sinus were reported in very little incidence of 1.25% each. And the involvement of cornea, fracture of supraorbital ridge and fracture of greater wing of sphenoid were 2.5% each.

Table 7: Other structures involved

Structure	No. of cases	Percentage
Conjunctiva	8	10%
Cornea	2	2.5%
Globe rupture	4	5%
AC	5	6.25%
Posterior segment	4	5%
Fracture of Supraorbital ridge	2	2.5%
Fracture of zygomatic arch	1	1.25%
Fracture of maxillary sinus	1	1.25%
Fracture of greater wing of sphenoid	2	2.5%

Treatment options

In the present study, Minimonoka stent was used for 22.5% (18) cases of canalicular lacerations and 16.25% (13) cases of canalicular tear who were not affordable were repaired with 24G Venflon tube (paediatric i.v cannula). 11.25% (9) cases underwent.

Evisceration as they had associated bad open globe injury, 32.5% (26) cases were treated with 6.0 Vicryl and combined with globe repair was done in 10% (8) cases.

Table 8: Treatment given

Treatment	No. of cases	Percentage
Lid repair with 6-0 Vicryl	26	32.5%
Combined with Canalicular tear repair with Minimonoka stent	18	22.5%
Canalicuar tear repair with 24G Venflon stent	13	16.25%
Combined with Evisceration	9	11.25%
Combined with globe repair	8	10%
Lid Repair with conservative management of ocular trauma	6	7.5%

Post-operative complications

In this study, there was extrusion of stent in 6.25% (5) cases and in 2.5% (2) cases there was stenosis of

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the punctum.

Table 9: Post-operative complications

Complication	No. of cases	Percentage
Stenosed punctum	2	2.5%
Extrusion of stent	5	6.25%

Discussion

As the injuries occur more commonly due to road traffic accidents in our study, preventive measures are to be taken while riding such as controlling speed. Males were more affected in comparison to females because of occupational injuries as well as injuries due to outdoor work are common in males. Whereas, domestic injuries are more common in females. In children injuries are more common while playing. The wounds should be treated as early as possible within 24 hrs. to achieve good results and to prevent unsatisfactory postoperative complications like infections, stenosis of the punctum, corneal exposure etc. This study showed that Minimonoka stent is an effective and easy tool in reconstructing canalicular tear, with successful anatomical and functional integrity. Visual acuity was not affected in any eyelid injuries unless associated with globe injury. The results were very much positive correlations with previous works as evident from table 10.

Table 10: Correlations with previous works

Author	Year	Sample size	Conclusions
Apurva H Suthar *et al*. [17]	2021	100	As the injuries occur more commonly due to road traffic accidents showing 54 cases in our study, preventive measures are to be taken while riding such as controlling speed. Domestic injuries are more common in females. This study showed that Minimonoka stent is an effective and easy tool in reconstructing canalicular tear, with successful anatomical and functional integrity
Aparajita Chaudhary [18]	2016	91	There is rapid rise in the incidence of ocular injuries due to increase urbanisation. Adequate and timely treatment can improve the functional and cosmetic outcome.
Ali Tabatabaei 19	2013	98	This study could possibly highlight the risk factors of eyelid laceration and provide the healthcare community with the essential recommendations regarding the safety precautions in dangerous settings, including daily routine work places.
Dr. D Murali Krishna [20]	2020	106	As the injuries occur more commonly due to road traffic accidents showing 72 (67.92%) of cases in our study, reventive measures are to be taken while riding such as controlling speed.
A. Anuradha [21]	2019	30	This study reveals that young adult males, most of whom were workers, were more prone to eyelid injuries. Timely meticulous management of the eyelid injury with minimal debridement of the wound and tension-free suturing gives better cosmetic outcome. Epiphora, notching of lid margin, or ectropion was the most common complication postoperatively
Present study	2022	80	The results of this study provide a series of high risk conditions which would be better avoided and lists a number of factors which could be modified. By distinguishing the individuals already at greater risk of developing eye lid laceration, recommendations could be established to prevent such incidents from occurring and avoid excessive costs and other burdens imposed on our society as a result. This is particularly true in developing countries like Iran, where drawing attention towards cost- effective expenditure of resources is essential, and this alone may prove to be of great benefit to the nation and its people.

Conclusion

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Conflict of Interest: None
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