



CLINICAL CHARACTERISTICS AND OUTCOMES OF OCULAR ADNEXAL INJURY AT A TERTIARY CARE CENTRE

Dr. Raghavendra Ramappa^{1*}, Dr. Madhuri Parande²,
Dr. Vishnupooja Thalangala³

Abstract

Background: Ocular adnexa involve eyelids, conjunctival sac, lacrimal gland, lacrimal drainage system, and bony orbit. In case of injury to the globe, ocular adnexa act as a shutter valve which will be breached in most ocular injuries. Deep wounds of the ocular adnexa will leave an ugly scar compromising aesthetics.

Aim: To study the modes of ocular adnexal injuries.

To study the types and severity of various ocular adnexal injuries.

To study the outcomes of management of ocular adnexal injuries.

Materials and method: A prospective intervention study was done on 70 patients with mechanical ocular trauma aging from 5 years to 80 years over a period of 6 months (1 March 2017-August 30, 2017) at a tertiary care centre in Mysore, India. All patients diagnosed with ocular adnexal injuries were included.

Patients with critical head injuries, previously treated adnexal injuries, pre-existing congenital adnexal anomalies, open and closed globe injuries were excluded. Patients underwent systemic evaluation and non-contrast computed tomography of the brain with facial cuts to rule out critical injuries. Detailed ophthalmic evaluation was done to determine the mode of injury, type, extent, and severity of adnexal injuries. Standard microsurgical practices were followed for further management of cases.

Results The commonest age group of presentation was 20-50 years (80.56%). The commonest mode of injury was road traffic accidents (53%). The most common structure involved was the eyelid with lid abrasion (42.8%) followed by conjunctiva with subconjunctival hemorrhage (32.8%), canthal injuries (04.20%), orbital wall fractures (20) %, orbital hemorrhage (02.85%) and least involved part was lacrimal –punctal area (02.08%). Palpebral fissure height was found to be reduced in cases of lid edema and lid laceration. Complete resolution was found in patients with lid edema. Levator function was poor in patients with mechanical ptosis which spontaneously resolved after 2-4 weeks.

In patients with traumatic disinsertion of the muscle referral to an oculoplasty surgeon was done.

Conclusion Even though adnexal injuries do not compromise visual acuity, they can be associated with severe head injuries. Early intervention should be done for adnexal injuries for good cosmetic outcomes.

Keywords: ocular adnexa, Ocular adnexal injury, lid tear, canalicular tear

^{1*}Associate Professor, Department Of Ophthalmology, Mysore Medical College And Research Institute, Karnataka, Email: dr.raghuophthal@gmail.com, 9686756750

²Assistant Professor, Department Of Ophthalmology, Mysore Medical College And Research Institute, Karnataka, Email: madsparande@gmail.com, 8867271253

³Junior Resident, Department Of Ophthalmology, Mysore Medical College And Research Institute, Karnataka, Email: poojapalaneeer@gmail.com, 9496516968,

***Corresponding Author:** Dr. Raghavendra Ramappa

*Associate Professor, Department Of Ophthalmology, Mysore Medical College And Research Institute, Karnataka, Email: dr.raghuophthal@gmail.com, 9686756750

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INTRODUCTION

The eyelids, conjunctival sac, lacrimal gland, lacrimal drainage system, and orbital contents—aside from the eye and optic nerve—are all part of the ocular adnexa.¹ Ocular adnexal injury is encountered in general emergency and speciality practices.² Large number of patients are not typically identified and treated at a single institution. Injuries to the periocular region, which includes the eye and its surrounding structures, can indeed occur frequently due to various activities and accidents. Despite its small size compared to the rest of the body, the eye is highly susceptible to injuries due to its exposure and sensitivity. Sporting activities, work-related tasks, household chores, road traffic accidents, and mishandling of fireworks are just a few examples of situations where such injuries can occur. It's crucial to prioritize eye safety measures and take precautions to minimize the risk of these injuries.³ Through tear film preservation and drainage, secretion from the eyelid glands, and other mechanisms, the ocular adnexa contribute significantly to the globe's protection and active immune mechanisms. Ocular morbidity, such as a cosmetic imperfection, irreversible facial disfigurement, epiphora, mechanical entrapment of tissue or fat within a fracture, loss of function owing to proptosis, or restricted movement, can result from a mechanical trauma injuring the ocular adnexal tissues.⁴ This study is being done to determine characteristics and outcome of adnexal injuries.

METHODS

The ethics committee of Mysore Medical College approved the study and the research was conducted as per the Declaration of Helsinki.

The prospective intervention study was done on 70 patients with mechanical ocular trauma aging from 5 years to 80 years over a period of 6 months (1 March 2017-August 30, 2017) at a tertiary care centre in Mysore, India.

Sample size: Prevalence of the disease 5%
 $S = Z^2 PQ / D^2$

S=sample size Z=std. value @ .05 level =1.96;
 P=proportion of prevalence =5% becomes 0.05 D= Margin of error or confidence interval = 5% (to be expressed in decimals) =.05

$S = (1.96 \times 1.96 \times .05 \times .95) / .05 \times .05 = 72$ in total

Inclusion criteria: All patients diagnosed with ocular adnexal injuries.

Exclusion criteria: Patients with critical head injuries, previously treated adnexal injuries and pre-existing congenital adnexal anomalies. Patients with open and closed globe injuries coming under

the BETTS classification and ocular trauma score.^{5,6}

Study procedure

Each patient underwent ophthalmic evaluation such as visual acuity assessment, palpebral fissure height, levator function, anterior and posterior segment examination, as well as a systemic examination was performed for all of the patients. The demographic details, mode of injury, type, extent, and severity of adnexal injuries, were studied.

Non-contact computed tomography of the brain with facial cuts was done to rule out cerebral injury, to check the integrity of bony orbit and other facial bones. Appropriate referral was done for head injury cases to the neurosurgery department.

In patients having lid laceration, after wound cleaning and local anesthetic wound edge was trimmed for fresh bleed, and necrotic tissue was removed, using standard microsurgical procedure lid margins were approximated in layer by layer approach to restore integrity of adnexa and provide maximum possible cosmetic outcome.⁷

In patients with lid laceration involving canalicular tear, after wound cleaning and local anesthetic, region of canalicular tear was explored. 24 G cannula after removing the needle, the blunt end was inserted via punctum to canalicular part, the exposed end of cannula near punctum was secured using 10-0 Ethilon suture to secure the tube. Followed by suturing the laceration of lid.⁸

The study parameters were assessed at the time of presentation and at the immediate post op period and on day 7, one month, and at the end of three months following primary repair. All the measurements (PFH, Levator function, etc.) taken before were repeated at each follow up visit.

Using a clear plastic ruler positioned as close to the eye as possible the palpebral fissure height was measured in all subjects while they were in the primary gaze posture from upper to lower lid margin at maximum height.¹¹

Levator palpebrae superioris function was assessed by calculating the amount of excursion measured with a millimetre scale when the eyelid moves from extreme downgaze to extreme up gaze with frontalis action negated.¹²

Data analysis

The data analysis was done using the Statistical Package for Social Sciences (SPSS) software version 28.0.

Descriptive statistics: mean, standard deviation, frequency and percent

Non-parametric statistics: chi-square test

Parametric statistics: t test-paired samples

For statistical significance, p-value < 0.05 was considered significant.

RESULTS

The commonest age group of presentation was 20-50 years (80.56%). The commonest mode of injury was road traffic accident (53%). The most common structure involved was the eye lid with lid abrasion (42.8%), followed by conjunctiva with subconjunctival hemorrhage (32.8%), canthal injuries (04.20%), orbital wall fractures (20%),

orbital hemorrhage (02.85%) and least involved part was lacrimal –punctal area (02.08%).

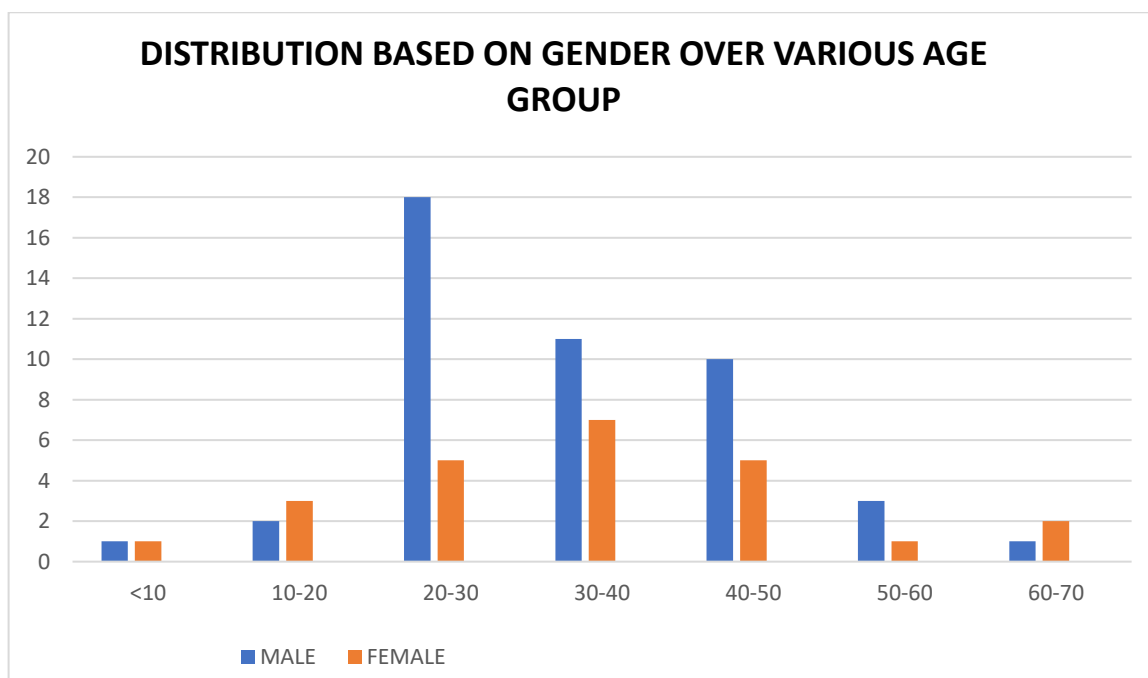
Palpebral fissure height was found to be reduced in cases of lid edema and lid laceration. Complete resolution was found in patients with lid edema.

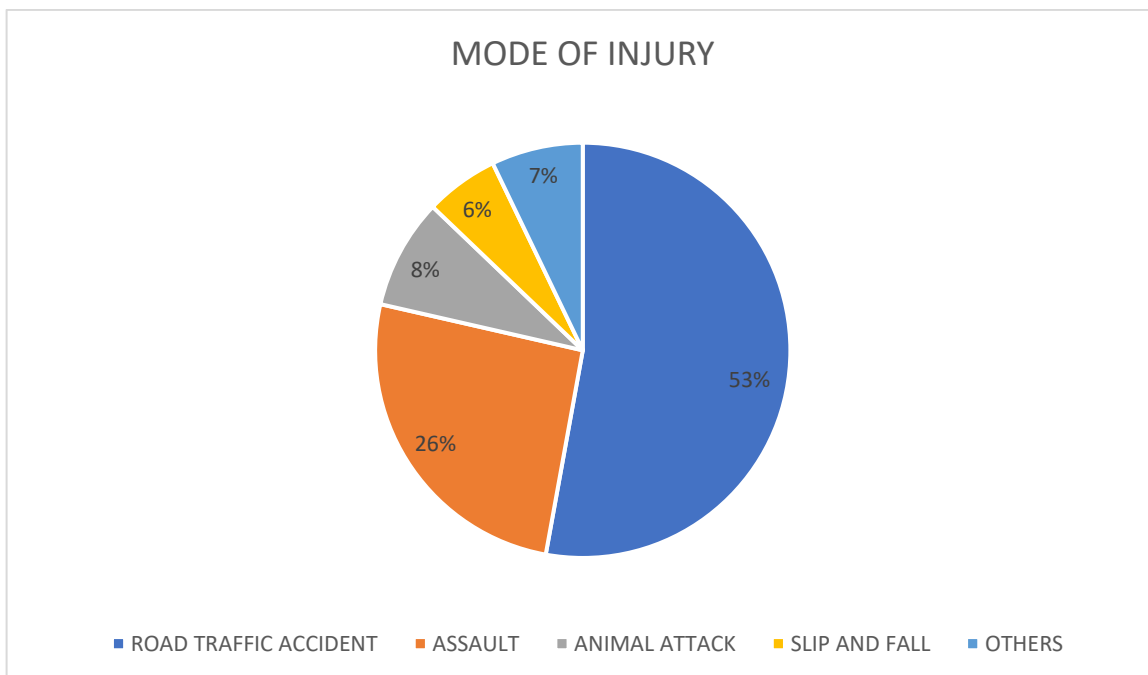
Levator function was poor in patients with mechanical ptosis which spontaneously resolved after 2-4 weeks.

In patients with traumatic disinsertion of the muscle referral to oculo-plasty surgeon was done.

DISTRIBUTION BASED ON AGE GROUP

AGE	NUMBER OF PATIENTS	PERCENTAGE
<10	2	2.9%
10-20	5	7.14%
20-30	23	32.86%
30-40	18	25.7%
40-50	15	21.4%
50-60	4	5.7%
60-70	3	4.3%





STRUCTURE INVOLVED	CASES	PERCENTAGE
EYEBROW		
ABRASION	11	15.7%
LACERATION	16	22.8%
BURNS	1	1.4%
TISSUE LOSS	8	11.4%
EYELID		
LID EDEMA	18	25.7%
ECCHYMOSIS	12	17.1%
ABRASION	30	42.8%
LACERATION	16	22.8%
PTOSIS	3	4.2%
BURNS	1	1.4%
CONJUNCTIVA		
CHEMOSIS	12	17.1%
SUBCONJUNCTIVAL	23	32.8%
HEMORRHAGE	22	31.4%
CONGESTION	2	2.8%
LACERATION		
CANTHAL INJURIES	3	4.2%
LACRIMAL APPARATUS		
CANALICULAR TEAR	5	7.4%
LACRIMAL GLAND AVULSION	0	0
ORBIT		
WALL OF ORBIT FRACTURE	14	20%
ENTRAPMENT OF MUSCLE	0	0
HEMORRHAGE	2	2.8%

PICTURES OF CASES WITH ADNEXAL INJURIES



1. LID LACERATION, SUPERFICIAL TYPE 1 NOT INVOLVING LID MARGIN
2. LID LACERATION, DEEP TYPE 2 NOT INVOLVING LID MARGIN
3. LID LACERATION TYPE 3 INVOLVING LID MARGIN
4. INJURY INVOLVING LACRIMAL DRAINAGE SYSTEM
5. LID LACERATION WITH PUNCTAL INJURY
6. SUBCONJUNCTIVAL HEMORRHAGE, CHEMOSIS AND ECCHYMOSES
7. LID LACERATION WITH LPS DISINSERTION
8. AVULSION OF LPS WITH EXTENSIVE LACERATION OF SKIN OF FOREHEAD



PRE-OP AND POST OP PICTURES OF PATIENTS WITH LID REPAIR WITH CANALICULAR INTUBATION

DISCUSSION

In the present study, the majority patients had lid involvement followed by conjunctival injuries which were treated by microsurgical (lid laceration, canthal injuries) and conservative management. The classification of lid laceration according to depth of involvement helped us in deciding the need and type of multilayer microscopic repair. Outcome of the surgical management was cosmetically good when early intervention done. The decrease in palpebral aperture width in almost all types of lacerations at presentation is due to tissue edema and hematoma producing mechanical ptosis. Levator function was poor in cases of mechanical ptosis with resolved spontaneously after 2-4 weeks. In case of traumatic disinsertion of levator palpebral superioris,

appropriate referral to oculoplasty surgeon was done after stay sutures.

Very minimal studies are done on adnexal injuries. Study by Lipke KJ, Gumbel HO on management of injuries of the eye and its adnexa majorly concentrated on reconstruction of adnexal structures did not concentrate on mode of injuries. Also, study concluded by quoting the necessity of interdisciplinary cooperation for management of cases of extensive injuries.³

Shukla et al. proposed a new proposed classification for ocular adnexal injuries using the same classification done by them conducted a study of epidemiological profiling of mechanical ocular trauma and analysis. An extensive study was done on 600 cases of adnexal injury which substantiated the requirement of new classification. In this study

most common age group involved was 20-39 years similar to current study. Males were affected more than females and road traffic accident was most common mode of injury and majority of patients had eyelid involvement followed by conjunctival injuries similar to current study.⁹ In current study open and closed globe injuries were excluded which was included by study by Shukla et al. In this study repeated measurements of palpebral fissure height and levator function test was not considered. Philips CD, Pandharpurkar M done a study on classifying eyelid laceration where they proposed SHEL classification this classification is exclusively made for eyelids but also addresses canalicular injuries but it doesn't include burn or acid injuries of the eyelids and the aetiological component of the injury.¹⁰

Complications of present study were ectropion (1.4%), entropion (1.4%), lid notching and scarring due to tissue loss (7.1%), epiphora (2.8%).

Limitations

This study excludes patients with globe injuries concentrates only on adnexal injuries. In cases of traumatic disinsertion of levator palpebrae superioris because of non-availability of oculoplasty surgeon appropriate referral was done after applying stay sutures.

Conclusion

Adnexal injuries do not affect visual acuity usually. Since majority of the patients of adnexal injury belong to younger age group and mode of injury is by road traffic accidents strict prevention strategy should be used.

All patients with head injuries co existing with adnexal injuries vitals should be checked and imaging should be done. Appropriate referral should be done for critical cases. So multidisciplinary approach will be required for few cases.

Early intervention should be done to adnexal injuries for good cosmetic outcome.

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