Clinical pattern and Management Outcome of Ocular Adnexal Injuries in Menelik II Comprehensive Specialized Hospital

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Abstract

Objective: To study the pattern and management outcome of ocular adnexal injuries at Menelik-II Comprehensive Specialized Hospital.

Methods: A hospital based cohort study conducted at Menelik II comprehensive specialized hospital From July 2023 to June 2024. The principal investigator and residents working at day time and duty time in the department were identifying patients with ocular adnexal injury. After getting informed consent, structured questionnaire was completed. Which includes relevant socio- demographic data, place, cause and nature of the injury, time interval between injury and presentation was recorded. The study population was classified according to System for Peri-Ocular Trauma (SPOT) classification. Data was cleaned, edited, entered, coded and analyzed using SPSS Version 27. Variables were compared using the appropriate statistical tests.

Results: A total of 45 eyes with ocular adnexal injuries of 43 patients studied. The male to female ratio was 3:1. The mean (SD) age was 27.3±14.0 years range 2- 70yrs. Regarding the setting of trauma, 17(37.8%) were due fighting accident of which 7(41.1%) is alcohol related. Road traffic accident accounts for 8(17.8%) of cases and another 17.8% are work related. Penetrating injury accounts for 29(64.4%) while 16(35.6%) are blunt injuries. Regarding the etiology, 12(26.7%) of the cases are metallic object, 10(22.2%) stone, 7(15.6%) glass objects. According to System of Periocular trauma (SPOT) classification, Type-1 injury (only upper lid involvement) accounts for 40% of cases followed by Type-2 (only lower lid involvement) which is 31.1% of the cases. Type-3(only medial canthus involvement) and Type-4(only lateral canthus involvement) is seen in 2(4.4%) and 1(2.2%) of cases respectively. Type-5 (any combination of those 4 zones) is seen in 10 eyes which accounts for 22.2% of the total.Primary repair was done for those 44 eyes of which 35(79.5%) were done by residents, 5(11.1%) by oculoplastic fellow and the rest 4(8.9%) by an ophthalmologist. The repair was done with in 24hr after the occurrence of trauma in 10(22.7%) of cases, 18(40.9%) within 24-72hr and the rest 16(36.4%) >72hr. Regarding the complications, it was studied for those who attended at least one month follow up and no complication was documented in 73% of cases. The most commonly encountered complication was lid margin notching seen in 4(10.8%) of cases followed by tearing in 3(8.1%) of cases.

Conclusion: The finding of this study shows that male gender and individuals in young age group are more vulnerable to ocular adnexal injuries. Moreover fighting accident is the most common cause of the injuries and significant proportion of it is alcohol intake related. Work related injuries and RTA are also among the major causes of these injuries which warrant use of protective tools in work place and proper use of safety measures to reduce RTA.

Key words: Ocular Adnexa, Eyelid, Canaliculi, Management outcome.

1. Introduction

Eyelids are vital structures that serve a function in protecting the globe from trauma, brightness, keeping the integrity of tear films, directing tears towards the lacrimal drainage system, and contributing to the cosmetic aspect of the face. (1, 2)

Lids are not only protective curtains for the eyes, but they also shape and beautify the face. The beauty of eyes rests in their finely shaped and aligned lids. (3)

Soft tissue trauma to the face is a common injury and comprises roughly 10% of all emergency room visits. (1-3)

Ophthalmic trauma is an important cause of morbidity among individuals and has also been responsible for additional cost of healthcare.

The increased mechanization in domestic and industrial settings as well as exposure to high-velocity traffic has resulted in increased incidences of trauma, including facio-ocular injuries. Eyelid injuries vary in severity and extent and present in a variable fashion. (1)

Lacerated wounds of the eyelids are common features of ocular trauma and often occur in isolation without any associated intraocular injuries.

Recovery of full eyelid function and maintenance of the lacrimal apparatus are important considerations when approaching lid trauma and the outcome of the surgical repair depends on the time of presentation, location, extent of tissue loss, and involvement of canthus and margin.

Ocular and periocular injuries can cause significant morbidity worldwide.

On a study done by Dereje Nigussie, Abebe Bejiga with title of ocular emergencies presenting to Menelik II Hospital, of the total ocular emergencies attended Menelik II hospital during the study period 15.7% had open adnexal injuries.(4)

In studies done on ocular injuries in Africa and Asia, the proportion of involvement of periocular soft tissue and adnexal injuries ranges from 12.3% to 30.6%. (5–11)

According to the United States Eye Injury Registry, periocular injuries account for 5% of all serious injuries, with the majority involving canalicular (81%) and/or eyelid (70%) structures.(12)

Regarding the outcome an interventional analysis revealed a favorable result and an overall favorable outcome, with a lower incidence of post-operative complications such as infections,

canalicular system stenosis, and sequelae to prolonged exposure, with injuries which presented at the earliest i.e. within 24 hours.(13)

The examination and care of patients who have suffered ocular adnexal trauma can be difficult. These patients frequently have multiple injuries and are treated by a variety of subspecialties.(14)

It is imperative that the patient is examined thoroughly so that additional injuries are not overlooked.

Eyelid and adnexal lacerations with or without associated globe injuries are a common emergency room challenge in our setup and still lacking data on its pattern, mechanism of injury, likelihood of hidden associated ocular injury and its management and complications, which will help us to identify common mechanisms of injuries and higher risk groups so that we can give valuable recommendation for policy makers on appropriate safety measures.

Knowing the common complications and its associated factors can help the physician in giving better care and identifying which patients need to be treated by higher experts.

2. Methodology

2.1. Study design

A hospital based cohort study

2.2. Study area

The study was conducted at Menelik II comprehensive specialized hospital, ophthalmology department, Addis Ababa, Ethiopia

2.3. Source population

All patients with Ocular adnexal injuries seen at the department of Ophthalmology

2.4. Study population

All patients presented to the department of ophthalmology with ocular adnexal injury during the study period.

2.5. Study period

July, 2023 to June, 2024.

2.6. Sampling technique

No sampling was employed as all eligible patients were recruited to the study

2.7. Variables

2.7.1. Independent variables

- Sociodemographic data (age, sex, place of residence, occupation)
- Mechanism of injury
- Type of management

2.5.2. Dependent variable

- Outcomes of management

2.8. Inclusion and exclusion criteria

2.8.1. Inclusion criteria

All patients presenting to the department with ocular adnexal injury during the study period will be included.

2.8.2. Exclusion criteria

- Patients presenting with eyelid and adnexal trauma, having repair in another institution
- Patients with comorbidities that limit or delay optimal management of the ocular adnexal injury

2.9. Data collection

- The principal investigator and residents working at daytime and duty time at eye emergency OPD identified patients with ocular adnexal injury.
- After getting informed consent, structured questionnaire was completed. Which includes

  - Relevant sociodemographic data.

  - Place, cause and nature of the injury

  - Time interval between injury and presentation to our hospital was recorded.

- In children in whom proper examination was impossible, the physical finding was filled after evaluation under anesthesia before repair.
- Mid face photograph of the patients was taken to compare with the postoperative outcome and the diagnosis was being confirmed by an ophthalmic oculoplastic and reconstructive surgeon.

The study population was classified according to System for Peri-Ocular Trauma (SPOT) classification.(18)

Type	*Zone*	*Anatomical region*	*Injury*
I	I	Upper eyelid	A=Superficial
			B=Partial thickness
			1=Without tissue loss
			2=with tissue loss
			C=Full thickness
			1=< ¼ tissue loss
			2=1/4-1/2 tissue loss (Subtotal)
			3= > 1/2 (Near total/Total loss of eyelid)
II	II	Lower eyelid	A=Superficial
			B=Partial thickness
			1=Without tissue loss
			2=with tissue loss
			C=Full thickness
			1=< ¼ tissue loss
			2=1/4-1/2 (Subtotal)
			3=>1/2 (Near total/Total loss of eyelid)
III	III	Medial canthus	A=Superficial
			B=Partial thickness (periosteum intact)
			1=Without tissue loss
			2=with tissue loss
			C=Full thickness (periosteum breached)
			1=Without tissue loss
			2=with tissue loss
			(Presence of injuries to the Lacrimal canalicular system is represented by an 'L')
IV	IV	Lateral canthus	A=Superficial
			B=Partial thickness (periosteum intact)
			1=Without tissue loss
			2=with tissue loss
			C=Full thickness (periosteum breached)
			1=Without tissue loss
			2=with tissue loss
V	Any Combination of above involving more than 1 zone		

The injuries were also sub-classified as:

a. Without globe injury

b. With globe injury

Each subject were re-examined for evaluation of the outcome after 3 month of the trauma, and an ophthalmic plastic and reconstructive surgeon confirmed the diagnosis.

2.10. Data quality control

The data collected were being reviewed and checked for completeness by the principal investigator.

2.11. Data processing and analysis

Data was cleaned, edited, entered, coded and analyzed using SPSS Version 27. Variables were compared using the appropriate statistical tests.

2.12. Ethical considerations

Research Proposal was presented to Department of Ophthalmology research and publication committee for approval. Informed consent was obtained from each patient to respond to the questionnaires.

2.13. Dissemination of the result

The result of the study will be presented to Department of Ophthalmology, CHS, Addis Ababa University and it will be sent for publication to respective local, regional, and international journals.

2.14. Operational definition

Ocular adnexa- The eye lids including medial and lateral canthi and the lacrimal drainage system.

Laceration- Full-thickness wound, caused by a sharp object (The wound occurs at the impact site by an outside-in mechanism)

Full thickness canthal laceration- canthal injuries with intact periostium.

Partial thickness canthal laceration- canthal injuries involving the perostium.

Full thickness lid laceration- lacerations extending from skin to the palpebral conjuctiva.

Partial thickness lid laceration- when a layer of the eyelid is intact at the site of injury.

3. Results

3.1 Background characteristics

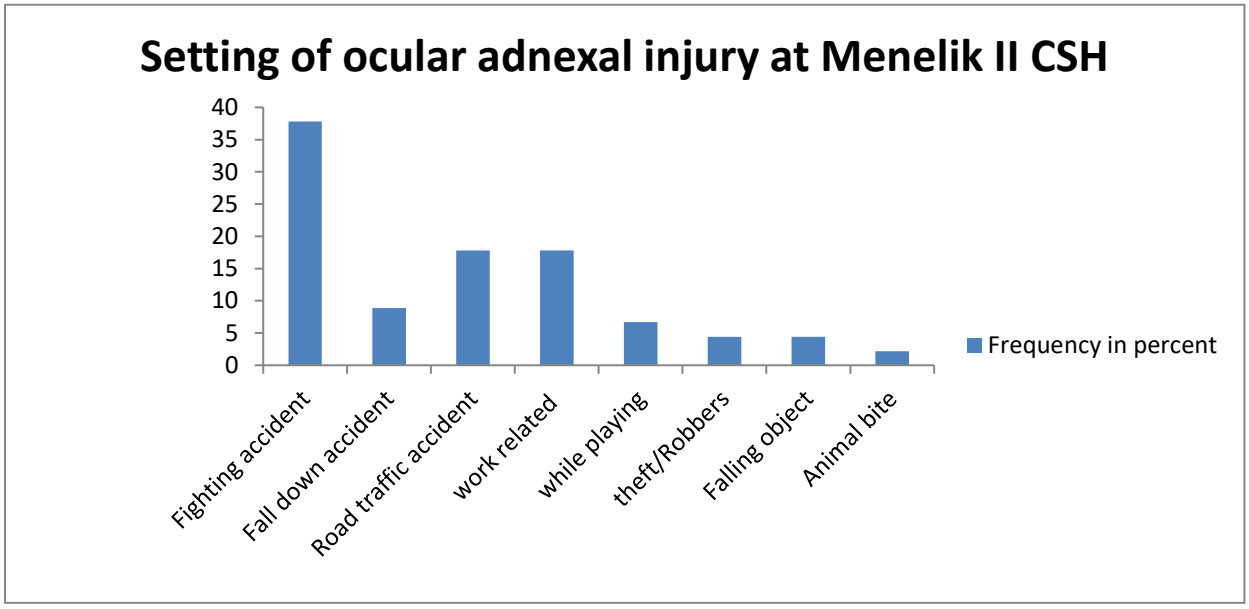
A total of 45 eyes with ocular adnexal injuries in 43 patients were studied. The male to female ratio was 3:1. The mean (SD) age was 27.3±14.0 years, median of 26 and ranging 2-70years

Age Group	Frequency	Percent
up to 15	7	15.6
16-30	28	62.2
31-45	6	13.3
46-60	3	6.7
>60	1	2.2

- Seventy-three percent of the participants are from urban and the rest are from rural area. Majority of the participants (66.7%) present with in 24hour.

3.2 Clinical pattern of ocular adnexal injury

Regarding the setting of trauma, 17(37.8%) were dueto fighting accident of which 7(41.1%) was alcohol related. Road traffic accident accounted for 8(17.8%) of cases and another 17.8% were work related.

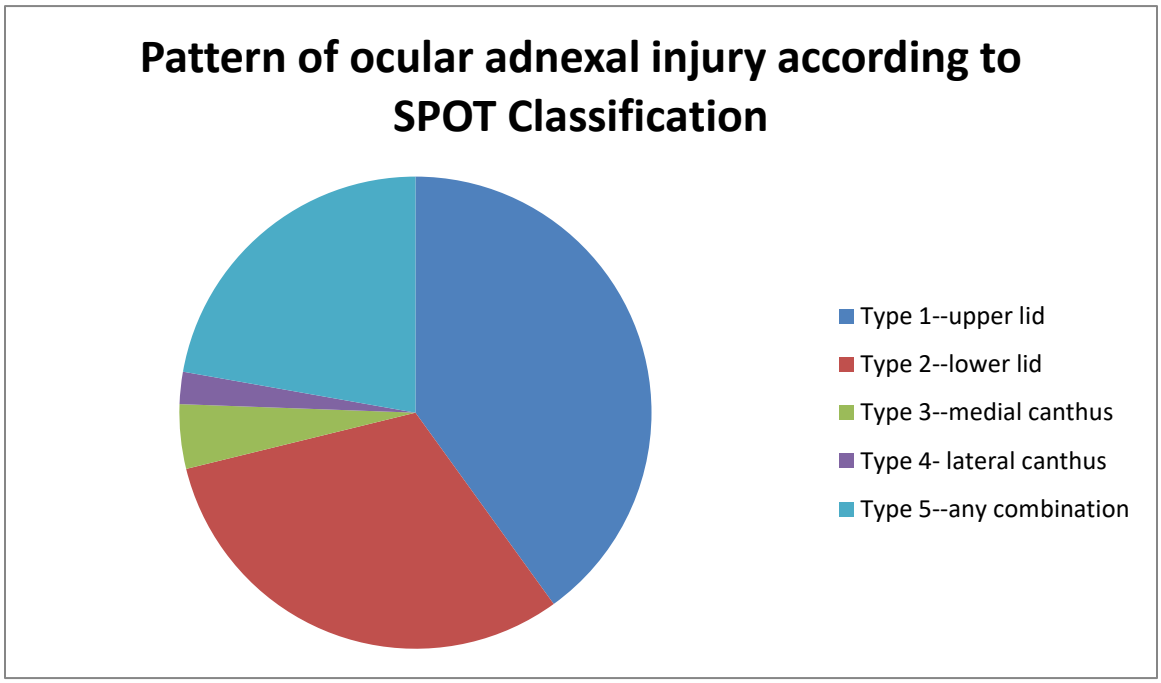


Penetrating injury accounted for 29(64.4%) while 16(35.6%) were blunt injuries. Regarding the etiology, 12(26.7%) of the cases are metallic object, 10(22.2%) stone and 7(15.6%) glass objects.

Etiology	Metallic	Stone	Glass	Wooden object	Fist	Other sharp objects.	Animal bite
Frequency	12(26.7%)	10(22.2%)	7(15.6%)	6(13.3%)	3(6.7%)	6(13.3%)	1(2.2%)

Both eyes are involved in 2(4.6%) of the study subjects, right and left eye involvement was comparable accounting for 46.5% and 48.8% of cases respectively. The eye globe is involved in 21 cases which accounts for 46.7% of the total.

According to System of Periocular trauma (SPOT) classification, Type-1 injury (only upper lid involvement) accounts for 40% of cases followed by Type-2 (only lower lid involvement) which is 31.1% of the cases. Type-3(only medial canthus involvement) and Type-4(only lateral canthus involvement) is seen in 2(4.4%) and 1(2.2%) of cases respectively. Type-5 (any combination of those 4 zones) is seen in 10 eyes which accounts for 22.2% of the total.



The upper lid was involved in 26(57.8%) of cases totally. Among these 21(80.8%) were full thickness and the rest were partial thickness.

Tissue loss was seen in 6(23%) of it and 4(66.7%) of the tissue loss is < ¼ of the eyelid while the rest 2(33.3%), ¼- ½ of the eyelid tissue is lost.

The upper lid margin is involved in 18(69%) of the cases.

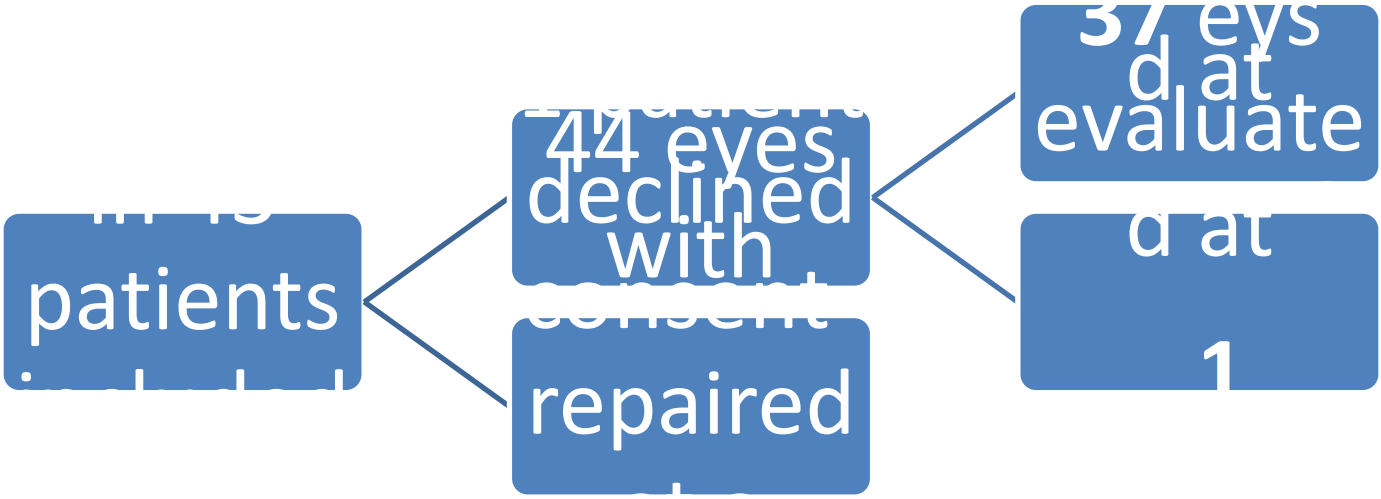
Regarding the lower lid involvement, it is seen in 20(44.4%) of cases and 12(60%) it is full thickness. Tissue loss was documented in 6(30%) of them and 5(83%) are < ¼ of the lid the rest 1 being in the range of ¼- ½. Lower lid margin is involved in 17(65%) of the cases.

Medial canthal involvement was 11(24.4%) of the eyes of which 8(72.7%) was partial thickness and the rest were full thickness (periosteum breached). The lateral canthus is involved in 3(6.6%) of which 2(4.4%) are partial thickness.

Regarding the lacrimal drainage system, canaliculi are involved in a total of 10 eyes, accounting for 22.2% of cases. Of which 5(50%) are only upper canaliculi, 3(30%), lower canaliculi and the rest 2(20%) both upper and lower canaliculi involved.

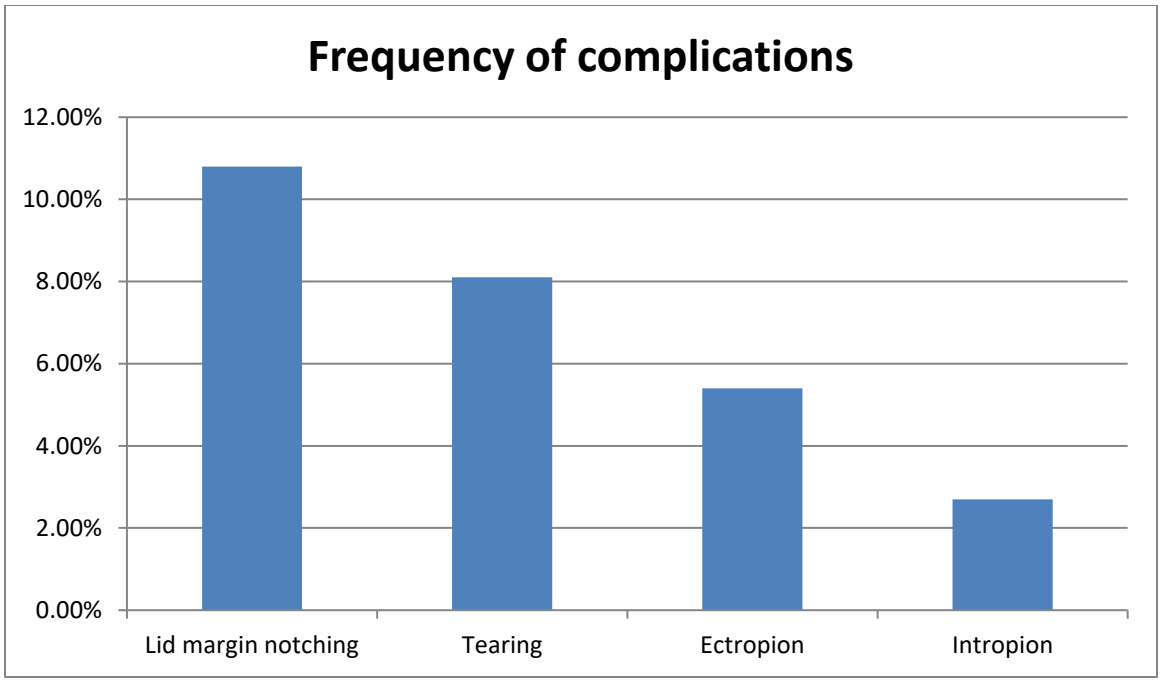
3.3 Management outcomes

Out of the 45 eyes of 43 patients included in the study, primary repair was done for 44 eyes. In the follow up visits a total of 37 eyes were evaluated at least at 1 month visit and only 31 patients were re-evaluated at 3 month visit and all those seen at 1 month visit were included to study the management outcome.



Primary repair was done for those 44 eyes of which 35(79.5%) were done by residents, 5(11.1%) by oculoplastic fellow and the rest 4(8.9%) by an ophthalmologist. The repair was done within 24hr after the occurrence of trauma in 10(22.7%) of cases, 18(40.9%) within 24-72hr and the rest 16(36.4%) >72hr.

Regarding the complications, it was studied for those who attended at least one month follow up and no complication was documented in 73% of cases. The most commonly encountered complication was lid margin notching seen in 4(10.8%) of cases followed by tearing in 3(8.1%) of cases.


Frequency of complications
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
Lid margin notching
Tearing
Ectropion
Intropion

4. Discussion

The finding of this study shows that male are more affected than female which is 75.6% of the total and it is in line with a study done by Santanu Das et, al. (15) on 64 eyes on Pattern causes and management of eyelid and adnexal injuries in a tertiary hospital in Bangalore, India which is 79.6% and it was 67.92% on study one with title of clinical study of eyelid injuries and their management done by Dr. C.S. Sandhya, et.al.(16) in Tirupati, India. Moreover the mean age was 26+/- 14.067 (SD) which is comparable to the previously mentioned studies. Those findings might be attributed to the fact that males in this age group are more involved in violence and occupationally more vulnerable.

In studies done by Santanu Das, et. al.(15) and Dr. C.S. Sandhya, et.al.(16) RTA is the major cause of trauma accounting for 75.6% and 685 respectively in contrary to our study on which RTA accounted for only 17.8% which might be due to the setting in which the study is done i.e ours include only those coming to the ophthalmology department missing those being treated for life threatening trauma either at adult emergency or ICU. Rather in our study fighting accident was found to be the most common cause of injury accounting for 37.8% the cases comparable to study done by Anuradha A, Raman M, Jarika J.(17) whose finding regarding the cause was accidental fall -36.7%, assault -23.3%. RTA accounts for 17.8% of cases in our study which is comparable to the Anuradha A, Raman M, Jarika J. (17) study which is 20%. Work related injury as also similar proportion in our study (17.8%).

Right and left eye involvement is comparable in our study (46.5% and 48.8%) respectively and both eyes are involved in 2 patients (4.6%) these findings are in line with other studies on ocular adnexal injuries and ocular injuries. (15, 16, 17.18)

The proportion of cases in which the globe is involved is significantly higher (46.7%) in our study when compared to the study done by Santanu Das, et.al.(15) which is only 5% which might be again attributed to the setup in which the study done i.e if a patient have injury to the globe the tendency to visit ophthalmic emergency unit would be higher.

The result of our study shows that the upper eye lid is involved in 57.8% and the lower eyelid 44.4% of cases. This finding also shows huge difference when compared with the study done by Santanu Das, et. al.(15) which reported 62% only periocular soft tissue injury and the lids involved in 43% of cases. This difference is again likely because the cause of the injury in 75.6% of cases were RTA in that study, which accounted for only 17.8% in our case. Canalicular involvement is reported to be 9.4% in study done by Dr. C.S.Sandhya, et.al.(16) Our study result still shows relatively higher proportion in this aspect too, 22.2% our cases had at least one canaliculus involved (10.1% upper, 6.1% lower and 4% both).

Regarding the management outcome the most commonly encountered complication was lid margin notching in our study which is 10.8% which is also the commonest complication in a study done by Dr. Jitendra Kumar, Dr. Shailendra Batham,(18) its proportion being 6.36% which is comparable to our result. It is found to be 3.77% in a study done by Dr. C.S.Sandhya, et.al. (16) which is lower. Tearing was reported by 8.1% of our study subjects higher than the result of the study done by Dr. Jitendra Kumar, Dr. Shailendra Batham,(18) which is 3%. The Dr. C.S.Sandhya, et.al.(16) sudy reported 1% incidence of epiphora among their study participants. The difference is attribured to the higher incidence of canalicular injury in our study.

5. Conclusion

The finding of this study shows that male gender and individuals in young age group are more vulnerable to ocular adnexal injuries. Moreover fighting accident is the most common cause of the injuries and significant proportion of it is alcohol intake related. Work related injuries and RTA are also among the major causes of these injuries which warrant use of protective tools in work place and proper use of safety measures to reduce RTA.

Nearly half of cases in our study had associated globe injury showing that meticulous examination of the globe is needed when a patient present with any kind of ocular adnexa injury.

Lid margin notching was the commonest complication of management outcome which suggests the need for developing skill on lid margin repair.

Limitation of the study

1. Small sample size and being single center study makes it difficult to generalize the results to larger population
2. Patients presenting to non-ophthalmic emergencies are not included which can alter the result.

6. Recommendation

1. Use of safety measures at work place and road traffic regulations have to be more advocated
2. Larger scale multicenter study can help to the pattern, causes and management outcome which can influence policy makers

Acknowledgement

We would like to send our deepest gratitude to the study participants willing to be part of the study and all residents helped us on filling out the initial data.

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