

## Road Accidents and Ocular Injuries

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### Abstract

**Introduction:** ocular injuries in RTA constitute a major but preventable cause of visual morbidity worldwide and so it is of public health importance. Aim of study was to assess the visual outcomes in patients attending tertiary care hospital with ocular injuries following RTA and compare various associated risk factors.

**Materials and Methods:** A prospective study was done with 104 cases of ocular injuries following RTA in GSL Medical College and Hospital to find out the visual outcome and compare various risk factors. Detailed History and clinical evaluation was done with follow up at 1<sup>st</sup> and 3<sup>rd</sup> week.

**Results:** Maximum cases were seen in the age group of 30-50yrs, more in males (82.0%), with 67% in two wheelers. Out of the 104 cases, 67% occurred at night, 50% was under the influence of alcohol. Out of which 61% of lid injuries followed by subconjunctival haemorrhage have good prognosis. 14% cases reported with severe ocular morbidity like open globe injuries with guarded prognosis.

**Conclusions:** Younger age group was mostly affected with male preponderance, alcohol and two wheelers being quite important risk factors. Early treatment of ocular injuries and use of protective wear result in better visual outcomes.

**Keywords:** Alcohol influence, Ocular injury, Road traffic accidents, Subconjunctival haemorrhage, Two-wheeler.

### Introduction

Ocular trauma is a significant cause of visual loss, especially in lower socioeconomic strata and underdeveloped countries. Ocular trauma is a disease with a bimodal age distribution, the first in the years of late adolescence and early adulthood and second in persons older than 60. Ocular trauma particularly affects men 3 to 5 times as frequently as women.

Ocular involvement in road traffic accidents (RTA) may involve the eyelids, lacrimal canaliculi, orbital wall, conjunctiva, cornea, sclera and extra ocular muscles. There may be prolapse of uveal tissue, vitreous loss, traumatic cataract, retinal detachment, vitreous haemorrhage, choroidal rupture, optic nerve avulsion or a ruptured globe.

The Pupillary involvement has a significant association with severity of head injury but there was an insignificant co-relation of the outcome. RAPD being most common and early indication of post traumatic reduced vision doesn't determine the final visual outcome.

A large worldwide meta-analysis of eye injury epidemiology was performed by the world health organization and published in 1998<sup>2</sup>. The analysis compiled information from various studies performed between 1971 and 2013. silent points emerged:

1. 55 million eye injuries which restrict activities for >1 day occur annually.
2. 7, 50, 000 eye injuries require hospitalization annually.
3. 2, 00, 000 open globe injuries occur annually.
4. 19 million people are unilaterally blind, 2.3 million have bilateral low vision and 1.6 million are bilaterally blind due to eye injuries.

Head injuries are a cause of hospitalization of 200-300 persons per 1, 00,000 population and about 25% of these are associated with ocular and visual defects.

Life time prevalence of eye injury in three large epidemiologic studies was approximately 20%.

Studies have shown that appropriate eye protection is rarely in place at the time of a severe eye injury.

In Indian scenario the tremendous increase in population and heavy increase in the road traffic has led to raise of road traffic accidents. Mostly road accidents are mainly by two wheelers without using helmet by using helmet reduces the serious injuries.

Thus, it is clear that prevention of severe eye injuries is an accomplishable goal and one that demands attention, given its far reaching social and economic impact. Ocular trauma is a health problem with identifiable prevention strategies.

The common cause of serious eye injuries with car occupants suffering penetrating injuries are caused by broken wind screen glass. These often Bilateral and commonly blinding. The introduction of laminated wind screens and the seat belt law virtually eliminated this problem.

Prevention of road accidents involves three common major aspects: awareness, use of protective eye wear and legislative changes to alter the circumstances where eye can be injured.

### Materials and Methods

A prospective study was conducted on all the RTA patients from attending Ophthalmology Department at GSL General Hospital Rajanagaram for a period of 02 years starting from May 2016 with a primary diagnosis of ocular trauma. The inclusion and exclusion criteria for the study

were as follows. This included a total of 104 patients from the places in and around Rajanagaram.

**Inclusion Criteria**

1. Patients of 10-60years.
2. Patients who sustained ocular injuries during road traffic accidents.

**Exclusion Criteria**

1. Old cases of road traffic accidents treated outside are excluded.
2. Past history of visual loss.

The following data was collected from the eligible subjects:

1. Demographic data and details of the injury were obtained. Information regarding time, location, type and mechanism of eye injury and use of protective eye wear was recorded.
2. The mechanism of injury was then categorised as blunt, sharp, projectile or combined. The question was asked if the car safety belts, helmets were in use at the time of the accident and whether he was intoxicated at the time of injury was collected using structured questionnaire.
3. Glasgow coma scale was applied to grade the severity of head injury.
4. Informed consent was taken from all of them. An eye examination was performed on each patient inclusive of best corrected visual acuity (if possible), slit lamp bio microscopy, direct and indirect ophthalmoscopy was done.
5. B-scan Ultrasonography was done where media prevented fundus evaluation.
6. Intra ocular pressure was recorded in all closed globe injuries, gonioscopy was done in closed globe injuries.
7. Plain X-ray skull in AP view, water’s view, nose-chin position and rhesse Parieto orbital, oblique projection were taken whenever necessary.
8. CT scan was done whenever required.
9. Routine investigation of blood and urine was done if required.
10. The trauma cases were classified based on standardized Birmingham eye trauma terminology (BETT).
11. The cases were managed on the basis of the guidelines given by eye trauma society, while some cases were referred to higher centres for further management.
12. The data was recorded only of patients who had reported at the completion of 1 and 3<sup>rd</sup> week of review.
13. A total number of 104 patients were subjected for analysis.

**Observations and Results**

1. In present study of 104 cases the maximum affected age group is 30-50yrs. 82.0 % males and 18% females are affected in accidents.
2. The head injury cases associated with ocular injury are 70% and remaining 34% head injury is not associated with ocular injury.

3. The involvement of RE is 73%, LE 27%, BE 5% ocular trauma causes significant no. Of people of productive age group to be unilaterally blind for rest of their life. In ocular injury most affected eye is right eye than left eye. Unilateral eye is common than bilateral eye.
4. In this study shows accidents more in night time 67% followed by morning 19% and evening 10% and afternoon 4%. None of the cases had eye protection.
5. Most of the RTA cases causing ocular trauma were two wheeler riders (67%) are more prone to ocular injuries when compared to persons travelling in auto or four wheeler and pedestrians.
6. The type of injury shows 87% closed globe injury than open globe injuries 13%. Of the closed globe injuries there are more number of lid injuries 61% mostly associated with subconjunctival haemorrhage which carry a good prognosis.
7. In open globe injuries most of the cases had a poor visual outcome due to formation of corneal scars and retinal detachment. In open globe injury there is only single penetration 14 cases and there is no double perforation and retained intraocular foreign body

**Table 1: Type of Vehicle Was Involved in RTA**

Type of Vehicle	No. of Cases	Percentage %
Two wheeler	64	61
Four Wheeler	25	24
Three Wheeler	10	10
Others	05	5
Total	104	100

**Observation**

Among those involved in RTA majority of them were driving two wheeler and Pedestrians hit by 2 or 3 wheeler are 61 % & just 24 % of the patients were riding four wheeler & followed by three wheeler 10%.

**Table 2: Closed Globe Injuries**

Type of Injury	No. of Cases	Percentage %
Eye lid injuries	55	61
Traumatic mydriasis with macular oedema	11	12
Traumatic hyphaema	08	09
Traumatic vitreous haemorrhage	07	08
Orbital fracture	05	06
Conjunctival laceration	04	04
Traumatic cataract	0	0
Total	90	100

**Observation**

The above table shows closed globe injuries the maximum no. of cases are eyelid injuries 61% followed by sub-conjunctival haemorrhage & they have very good prognosis. There are few cases of traumatic hyphaema 09%, VH 08% which carry guarded prognosis. .

**Table 3: Complications of the Injured Cases**

Complications	No. of cases	Percentage %
Corneal Opacity	12	33
Cataract	09	24
Retinal Detachment	06	16
Posterior Subluxation of lens	06	16
PVD	02	05
Uveitis	01	03
Endophthalmitis	01	03
Total	37	100

**Observation**

The most common complication is corneal opacity 30% followed by cataract 24% and Retinaldetachment 16%.

**Table 4: Final Visual Outcomes**

Vision	No. of Cases	Percentage %
6 / 6 – 6 / 9	69	71
6 / 12 – 6 / 18	13	6
6 / 24 – 6 / 36	11	12
6 / 60 – CF 1 MT	03	3
< CF 1MT – PL+	05	5
NOPL	03	3
Total	104	100

**Observation**

A different level of visual impairment is noted 71% had a good final visual outcome; 8% had significant loss & 3% complications.

**Discussion**

In 104 cases the maximum affected age group is 30-50yrs. Males are 82.0 % and 18% females are affected in accidents. As males are more prone for working activities than females in our country male preponderance is more than females. Females are confined to home and do less risky jobs than males. Accidents are more in night time because of drunken driving and visibility of light is poor and awake fullness is less in night.

Most of the RTA cases causing ocular trauma were two wheeler riders (67%) who are more prone to ocular injuries when compared to persons travelling in auto or four wheeler and pedestrians. Two wheelers are common in our country because of low cost easy availability of loans/EMI. Driving without helmet is the norm in this part of the country and riders do not follow proper traffic rules on the highway as there is a scarcity of traffic policemen on these roads. All of these contribute to RTA.

In cases with accidents due to driving two wheelers and four wheelers, closed globe injuries are more common than open globe injuries. In either case the type of injury is of a concussion type and there are no projectile agents. The same is reflected in this study.

The right eye is more common than left eye as studied by Govind Singh tityal et al. The most common complication occurring in RTA in this study is corneal opacity. In the study of vats et al also, the common complication is corneal opacity.

The visual outcome in road traffic accidents 71% had good visual outcome and 11% had significant vision loss that is less than 6/60 vision i.e. economic blindness. To overcome road accidents there should have strict rules and regulations.

**Conclusion**

Ocular injuries due to RTA that involve lids cause a certain degree of cosmetics disfigurement and don't have any effect on any final visual outcome. Only those injuries which involve the globe have a poor prognosis for the final visual outcome. More RTA were common during night time when the visibility is poor awake fullness is less and alcohol abuse is more.

RTA being one of the most important and preventable cause of ocular morbidity should be taken up as an important public health problem and protective measures must be used to decrease its incidence.

"Precaution is better than cure" as far as ocular injuries in RTA are concerned. In India drunken driving, not following safety measures and not following traffic rules are common causes of ocular injuries in RTA.

The prevalence of ocular trauma is higher than that of diseases like DR, Glaucoma, and AMD. This can be avoided by implementing the traffic rules, maintaining speed limits, wearing helmets when driving two wheelers and not driving under the influence of alcohol are some of the measures to minimize RTA in our country.

Specialists also should be available to treat ocular trauma complication cases to prevent blindness in early stage. Proper management of case at right time can prevent person becoming blind.

Recommendations for the prevention of ocular and orbital injuries could be:

1. Passengers sitting in the front seats more commonly sustain ocular trauma.
2. Use of safety seat belts must be made compulsory.
3. All road vehicles must have laminated glass wind screen.
4. The practice of sitting of a parent on one of the front seats shouldn't be allowed.

There is an urgent need for education of the public through the use of news media and television programmes. Use of unbreakable plastic spectacles should be encouraged. Road markings, guiding traffic rules and drivers, need to be re-painted more frequently. Paint should be fluorescent so as to be clearly visible during darkness.

**Summary**

A comprehensive study of various types of ocular injuries, their visual outcome before and after management has been under taken from the 104 cases of ocular injury following RTA, attending ophthalmology department, GSL, Rajanagaram.

In this study closed globe injuries with involvement of adnexal like lids are more common than open globe injuries.

Percentage of closed globe injuries is 87% than open globe injuries with 13%. Final visual outcome after management is 89% in closed globe injuries in this study.

**Conflict of Interest:** None.

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