

Original Research Article

Ocular Injuries in Road Traffic Accidents

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ABSTRACT

Background

Ocular injuries in road traffic accidents (RTA) constitute a major but preventable cause of visual morbidity worldwide and so it is of public health importance. The aim of present study was to assess the risk factor, clinical features and visual outcome in patients attending tertiary care hospital with ocular injuries following RTA.

Methods

A prospective study was done with 68 cases of ocular injuries following road traffic accidents in tertiary care centre. Patients were selected on the basis of inclusion and exclusion criteria. Detailed history and clinical evaluation was done with follow up. Results were analyzed using SPSS version 25.0.

Results

Ocular injuries following RTA were mostly seen in males (86.7%) and in the age group of 25-45years, it was more common with 80.8% in two wheelers. Out of the 68 cases, 80.88% occurred at night, 64.7% was under the influence of alcohol. Most common ocular manifestation of RTA was subconjunctival haemorrhage (61.7%) followed by periorbital edema and echymosis (60.2%). The majority of cases had a visual acuity in the range of 6/6 – 6/18 and only 3 (4.41%) cases had a positive perception of light at the time of presentation.

Conclusion

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, helmet, ocular injury, prevention, RTA.

INTRODUCTION

In underdeveloped nations, one of the main causes of avoidable blindness is ocular injury. According to a study on mid-face fractures, RTA accounted for 64% of the causal factors. Ocular trauma is the primary cause of avoidable unilateral blindness, accounting for over 55 million eye injuries globally each year, of which 2.3 million result in bilateral injuries and 19 million in unilateral injuries.[1,2]

Although the eye makes up only 0.1% of the body's surface area, injuries to it can result in vision loss, which is a vital sense.[3] Ocular injuries are prevalent despite the presence of protective systems such as strong bone orbital walls, eyelids protecting the eyeball, the eyeball remaining in a cushion of fat, and rearward displacement of the eyeball in fractures.[1] RTA is becoming more common, leading to significant ocular morbidity. Unilateral or bilateral vision loss or decrease can have a financial cost on both the affected individuals and society as a whole because of missed employment, postponed hospital admissions, extended follow-up, and expensive visual rehabilitation. Emotional stress is strongly linked to ocular injuries.[1]

RTA-related ocular injuries can affect the conjunctiva, cornea, sclera, orbital wall, extra-ocular muscles, vitreous haemorrhage, retinal detachment, and even the globe.[4] The factors that contribute to the increased occurrence of RTAs in many developing countries include bad roads, poor vehicle conditions, reckless driving, driving under the influence of alcohol or other drugs and poor adherence to traffic rules. [5,6] Even minimally displaced fractures of orbit can result in functional and aesthetic deformities.[7]

It is evident that preventing serious eye injuries brought on by RTAs is a goal that can be achieved.[8] It can be accomplished by educating the public about the dangers of reckless driving, encouraging the use of safety goggles, and changing the law to change the situation. Hence the present study was done to assess the risk factor, clinical features and visual outcome in patients attending tertiary care hospital with ocular injuries following RTA.

MATERIAL AND METHODS

The present prospective study was done among cases of ocular injuries followed by road traffic accident at tertiary care center during the study period of one year. Ethical clearance was taken from institutions ethics committee before the commencement of study. Patients or their relatives were asked to sign an informed consent form after explaining them the procedure.

Through convenience sampling a total of 68 cases of ocular injuries occurred via road traffic accident were selected on the basis of following inclusion and exclusion criteria.

Inclusion criteria

Ocular trauma cases following RTA, irrespective of the age group and gender, presenting to the ophthalmology OPD were included in the study.

Exclusion criteria

Ocular trauma due to any other aetiology and patients who were terminally ill, unconscious, and not co-operative were excluded from the study.

Patient information and sociodemographic data were acquired. Details on the kind of accident, the time, and the place were recorded. Following the injury, signs and symptoms were noted.

Using a torch light, a thorough inspection was conducted. Using Snellen's chart, visual acuity was measured. Detailed examination was carried out by slit lamp. Gonioscopy was carried out when required. A tonometer applanation was used to record the IOP. It was not able to be recorded in a few circumstances. When necessary, both direct and indirect ophthalmoscopy were carried out. In cases where there were no media opacities, retinoscopy was used. When needed, plain x-rays of the skull were taken in the A-P, lateral, Water's, and Rheese parieto-orbital-oblique views. When media opacities were present and a posterior segment abnormality was indicated, B-scan ultrasonography was carried out. MRIs and CT scans were performed when needed. Patients underwent thorough examinations by ENT surgeons, general surgeons, maxillofacial surgeons, and general physicians, depending on the presentation. Most patients were treated at the casualty and outpatient department levels, although some needed to be admitted for in-depth care. Following their hospital discharge, patients were checked on once a week, including those receiving treatment on an outpatient basis.

Data collected was noted in excel sheets. Results were analyzed using SPSS version 25.0 keeping level of significance $p < 0.05$. Continuous variables were summarised using means and standard deviations. Categorical variables were summarised using frequencies, proportions and percentages.

RESULTS

Table 1: Demographic factor of cases

Demographic factor		Frequency (percentage)
Age (in years)	0-10	0
	11-20	9 (13.2)
	21-30	27 (39.7)
	31-40	14 (20.5)
	41 -50	11 (16.1)
	51 above	7 (10.2)
Gender	Male	59 (86.7)
	Female	9 (13.2)

Out of 68 cases maximum were from the age group of 21 to 30 years (39.7%) and 31 to 40 years (20.5 %). The males (86.7%) were more in number as compared to females (13.2%) as shown in table 1.

Table 2: Risk factors related to road traffic accident

Risk factors		Frequency (percentage)
Influence of alcohol	Yes	44 (64.7)
	No	24 (35.3)
Time of accident	Day	13 (19.2)
	Night	55 (80.8)
Type of vehicle	Pedestrian	3 (4.4)
	Bicycle	1 (1.5)
	Two wheeler (bike)	55 (80.8)
	Three wheeler (auto)	1 (1.5)
	Four wheeler (cara0	8 (11.8)

Use of protective wear	Yes	4 (5.9)
	No	64 (94.1)

Out of all the cases 64.7% were under the influence of alcohol and 80.8% occurred at the time of night. Most of the people were using two wheeler (80.8%) followed by four wheeler (11.8%), pedestrian (4.4%), bicycle (1.5%) and three wheeler (1.5%). Protective wear was used by only 5.9% of people as shown in table 2.

Table 3: Type of ocular injuries in RTA cases

Type of injury	Frequency (percentage)
Periorbital edema and echymosis	41 (60.2)
Upper lid laceration	14 (20.5)
Infraorbital hematoma	1 (1.5)
Conjunctival injury- SCH	42 (61.7)
Congestion	10 (14.7)
Corneal injury – hyphema	1 (1.5)
Papilloedema with macular edema	1 (1.5)
Berlin edema	4 (5.8)
Globe rupture	1 (1.5)

Most common type of injury was conjunctival injury (SCH) (61.7%) followed by periorbital edema and echymosis (60.2%). Upper lid laceration of left and right eye was present in 20.5% cases, congestion in 14.7% and Berlin edema in 5.8% as shown in table 3.

Table 4: Visual acuity at the time of presentation

Visual acuity	Frequency (Percentage)
6/6-6/18	60 (88.2)
6/36-CF@CF	5 (7.3)
PL+ve	3 (4.4)

The majority of cases had a visual acuity in the range of 6/6 – 6/12 (88.2%) and only 3 (4.41%) cases had a visual acuity of perception of light at the time of presentation as shown in table 4.

DISCUSSION

There is a broad range of ocular injuries shown in this study after RTA who came to the department of ophthalmology. Convenience sampling was used to choose the 68- sample size. Similar to several earlier studies, we discovered that men are more likely than women to sustain eye injuries. This might be because they lead more active lives than women, in addition to having different occupations.[9-12] Similar male predominance was found in a study from Western Maharashtra by Patil et al.[13] The current study found that individuals aged 21 to 40 represented 60.2% of the occurrences. While individuals under the age of 30 accounted for 45.13% in study conducted by Sree et al. study.[1] According to the majority of previous research, the age group of 20 to 30 years old has the highest occurrence of eye injuries.[12,14]

Out of all the cases 64.7% were under the influence of alcohol and 80.8% occurred at the time of night. Most of the people were using two-wheeler (80.8%). In the study done by Patil et al, majority (35%) were due to motorized 2 wheelers followed by 4 wheelers (25.9%). [13] Two

wheelers contributed more to ocular trauma as the exposure, area of contact and direct impact are high in case of two wheelers compared to four wheeler vehicles. In a study conducted by Fredrick M et al it was found that on assessing the vehicle driven during the road traffic accident, 85% (n=136) patients had driven 2-wheeler, 11.3% (n=18) had driven 4-wheeler, 3.8% (n=6) had driven 3-wheeler which is similar to our study. [15]

Most common type of injury in our study was conjunctival injury (SCH) (61.7%) followed by periorbital edema and echymosis (60.2%). Upper lid laceration of left and right eye was present in 20.5% cases, congestion in 14.7% and berlin edema in 5.8%. Hyphema and globe rupture was present in 1.5% of cases. Sree et al.'s study found that subconjunctival haemorrhage occurred in 58.33% of patients, orbital fractures occurred in 22.22% of patients, lid laceration occurred in 65.88% of cases, and periorbital ecchymosis was observed in 64.58% of patients.[1] 17.3% of patients in the study by Qayum et al. had corneal abrasions.[2] In half of the cases in the Shtewi et al. research, hyphema was observed.[4] In a study by Kamath et al on orbital fractures in a tertiary healthcare facility, out of 422, total 35 patients had an infraorbital rim fracture; 10 patients had a floor fracture; 4 patients had a lateral wall fracture; 6 patients had a medial wall fracture; 5 patients had a pure blow out fracture; and 1 patient had a roof fracture. Of the 95 instances, 47 patients showed ecchymosis, making it one of the most prevalent clinical findings. One case exhibited solely ecchymosis, whereas the other 46 individuals had other clinical symptoms. There were 24 individuals with lid tears, the majority of which having partial thickness tears. Both the upper and lower lids were torn in four cases. There were orbital fractures in 7 instances. Berlin's oedema was present in one patient, vitreous haemorrhage was present in another, and three lid tears were unaccompanied by ocular injuries. [16]

In our study the majority of cases had a visual acuity in the range of 6/6 – 6/18 and only 3 (4.41%) cases had a positive perception of light at the time of presentation. 35 patients in a research by Bhattacharjee et al. suffered indirect traumatic optic neuropathy out of 129 consecutive occurrences of cranio-orbital damage. At presentation, 66.39% of patients with RTA had vision in the range of 6/6–6/12, and 28.19% of patients had vision in the range of 6/18 to counting fingers to one metre. Two patients (2.11%) only perceived light, while two patients (2.11%) did not see light at all.[17] In a study conducted by Patil K et al it was found that The majority of cases 64 (67.39%) had a visual acuity in the range of 6/6 – 6/12 and only 2 (2.11%) cases had no perception of light after 6 weeks.[18]

LIMITATIONS OF THE STUDY

Limitations of the study were small sample size and fixed time duration due to which a larger patient population could not be evaluated due to lack of time.

CONCLUSION

People who fall in the category of younger age group were mostly affected with male preponderance, alcohol and two wheelers being quite important risk factors. Conjunctival injury and periorbital edema with echymosis were the most common injury. Visual acuity at the time of presentation directly correlated with the severity, mode of injury and involvement of vital structures in the visual axis. Early treatment of ocular injuries and use of protective wear result in better visual outcomes.

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