

## Original Research Article

# Ocular morbidity following road traffic accidents: a retrospective analysis

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**Received:** 11 February 2017

**Accepted:** 08 March 2017

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### ABSTRACT

**Background:** Ocular trauma is a well-known cause of blindness and visual impairment and in industrialised nations it has become the reason for extended hospitalization of ophthalmologic patients. Anually, there are in excess of 2 million cases of ocular trauma, with more than 40,000 individuals sustaining significant visual impairment on a permanent basis. The aim of the present study was to study the pattern of ocular involvement in variety of road traffic accidents, attending the emergency department of Gauhati Medical College and Hospitals; analyse and correlate various factors playing roles in etiology and evaluate the final visual outcome.

**Methods:** The study was conducted at a tertiary care centre in which retrospective analysis of 500 cases, who sustained injury involving any part of eye due to road traffic accidents attending emergency department from 1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2016, was performed.

**Results:** The predominant age group was between 21-30 years of age with males (75.2%) dominating over female (24.8%). Lid injury in the form of abrasions, lacerations, oedema to full thickness tear, is the commonest presentation in majority of the studies. RTA is more common in rainy and winter months and during the daytime. Two (2) wheelers is the common type of vehicle involved. Final visual outcome in the present study is good and comparable to other studies.

**Conclusions:** Driving under the influence of alcohol is an important etiology in Northeast India. A significant section of the patients were driving two-wheelers and not following the safety precautions as advised, which calls for rigorous implementation of traffic rules. Last but not the least, it is often said that the prevention is the best way to minimise such unwanted events. Public sensitisation, strict adherence to traffic rules and improved roads are some of the few steps that can go a long way to reduce such events.

**Keywords:** Ocular trauma, Two wheelers, Lid injury, Visual outcome

### INTRODUCTION

The eyes represent only 0.1% of the total body surface and 0.27% of the anterior body surface<sup>1</sup> but their significance to individuals and the society is disproportionately higher. The eye is the third most common organ affected by injuries after the hands and feet.<sup>1</sup> Ocular trauma is a well-known cause of blindness and visual impairment and in industrialised nations it has become the reason for extended hospitalization of

ophthalmologic patients.<sup>2</sup> Ocular trauma is an important cause of blindness and in some centres it accounts for half or more of eyes enucleated.<sup>3</sup> Anually, there are in excess of 2 million cases of ocular trauma, with more than 40,000 individuals sustaining significant visual impairment on a permanent basis.<sup>4</sup> Considering the current trends, the number of people killed and injured on the world's roads will rise by more than 60% between 2000 and 2020, most of the injuries will occur in developing countries.<sup>5</sup>

The study was conducted with the aim to study the pattern of ocular involvement in variety of road traffic accidents, attending the emergency department of Gauhati Medical College and Hospitals, to analyse and correlate various factors that are likely to play a role in road traffic accidents and to assess the final visual outcome.

## METHODS

The study was conducted at a tertiary care centre in which retrospective analysis of 500 cases, who sustained injury involving any part of eye due to Road Traffic Accidents attending Emergency Department of Gauhati Medical College & Hospital from 1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2016, was performed. The patient's case sheet was examined from which we noted down the examination findings at presentation and final visual outcome till the last follow-up at 8 weeks. Classification of eye injury was done on the basis of Birmingham Eye Trauma Terminology (BETT).

### Inclusion criteria

Persons who sustained injury involving any part of eye due to road traffic accidents (RTA).

### Exclusion criteria

Persons with co-existing diseases like cataract, hypertension, cardiac and neurological disorders were excluded from the study and persons above 60 years of age.

Appropriate statistical methods were applied to analyse the data, wherever required.

## RESULTS

### Age distribution

The commonest age of presentation was in the age group of 20-30 years with 33.3% of total cases followed by 11-20 years group contributing 28%.

**Table 1: Showing age group distribution.**

Age group (Years)	No of cases (N=500)	Percentage (%)
0-10	42	8.4
11-20	140	28.00
21-30	167	33.3
31-40	76	15.2
41-50	53	10.6
51-60	22	4.4

### Sex distribution

Male (75.2%) outnumbered female (24.8%) counterparts in contributing to the cases in the present study.

**Table 2: Showing sex distribution.**

Sex	No of cases (N=500)	Percentage (%)
Male	376	75.2
Female	124	24.8

### Ocular involvement

The patients presented to the emergency with a wide spectrum of ocular involvement which includes lid ecchymosis (42.4%), conjunctival injury (33.0%), corneal injury (7.6%), orbital fracture (5.8%), disc oedema/haemorrhage (5.2%), retinal haemorrhage (3.6%) and complete loss of vision (2.4%).

**Table 3: Depicting different ocular involvement in the study.**

Types	No (N=500)	Percentage (%)
Lid injury	212	42.4
Conjunctival injury	165	33.0
Corneal injury	38	7.6
Lens injury	32	6.4
Hyphaema	30	6.0
Orbital fracture	29	5.8
Disc oedema/haemorrhage	26	5.2
Retinal haemorrhage	18	3.6
Complete loss of vision	12	2.4

### Factors affecting road traffic accidents

#### Weather conditions

The majority of accidents took place in the winter months of January, February and December, suggesting a role of Weather in the etiology of road traffic accidents. It can be deduced that majority of accidents took place during the festive season.

**Table 4: Showing month wise distribution of cases.**

Month	No. of cases (n=500)	Percentage(%)
January	87	17.4
February	61	12.2
March	29	5.8
April	48	9.6
May	27	5.4
June	29	5.8
July	20	4.0
August	32	6.4
September	31	6.2
October	46	9.2
November	34	6.8
December	56	11.2

*Diurnal variations*

Majority of the accidents took place during the daytime.

**Mode of transport and other factors**

The maximum number of cases (33.2%) took place in cases of two wheelers whereas in 9.8% of cases etiology could not be ascertained due to various reasons.

Most of the two wheeler riders had not worn the helmets at the time of accidents. A significant portion of them (65.06%) was under the influence of alcohol (confirmed by alcohol breath assay). In cases of two wheelers the pillion riders (67.46%) were affected more than the person in the driver seat.

**Table 5: Showing distribution of cases as per the mode of transport.**

Mode of RTA	No. of cases (N=500)	Percentage (%)
Two wheelers	166	33.2
Three wheelers	75	15.0
Four wheelers	56	11.2
Truck drivers	96	19.2
Pedestrians	58	11.6
Unknown etiology	49	9.8

**Visual outcome at 8 weeks follow up**

Vision better than 6/12 was found in 49.2% cases, 6/18 – 6/36 in 31.2% cases, 6/60 – 2/60 in 11.8%, 1/60 – PL in 4.8% and absence of light perception in 3.00% of cases.

It is seen that the visual outcome is good in majority of the patients. One of the important reasons was that the

**Table 7: Showing comparison of ocular involvement among various studies.**

Injury	Gregg (2000) <sup>9</sup> (in %)	Chanderkant (2002) <sup>10</sup> (in %)	McGwin(2005) <sup>11</sup> (in %)	Present study (in %)
Lid inj	14.29	59.2	88.4	42.4
Conj inj	-	29.2	3.3	33.0
Scleral inj			0.41	
Cornea inj	85.71	2.5	7.1	7.6
Hyphaema	14.29	-	-	6.0
Lens inj	14.29	3.3		6.4
Post. Seg. Injury	-	5	0.11	8.8
Orbit fracture	-	15.83	-	5.8

From the Table 7, it is clear that lid injury in the form of abrasions, lacerations, oedema to full thickness tear, is the commonest presentation in majority of the studies. The spectrum is a diverse one.

patients were brought to the emergency room and prompt and, adequate treatment was administered on time. 108 emergency services run by Government of Assam played an extremely positive role by cutting the time lag between the accident site and hospital bed.

**Table 6: Showing visual acuity at final follow up (at 8 weeks).**

Visual acuity	No. of cases (N=500)	Percentage (%)
> 6/12	246	49.2
6/18-6/36	156	31.2
6/60-2/60	59	11.8
1/60-PL	24	4.8
NO PL	15	3.0

**DISCUSSION**

**Age distribution**

The predominant age group was between 21-30 years of age which is comparable with few other studies like Emem et al (2012) found 21- 30 years of age as the predominant age group in their study while Dhasamana et al (2012) reported 21- 40 years of age.<sup>6,7</sup>

**Sex distribution**

The majority of patients in the study were males - 75.2%. The reason may be that the males are more involved in outdoor activities in our society and also that the incidence of driving under the influence of alcohol is higher in males when compared to females. Cao et al (2012) reported incidence of Male: Female as 83.8%:16.2% in their study while Emem found it to be 61.4%:38.6% respectively.<sup>6,8</sup>

**Weather conditions**

The Table 8 depicts that RTA are more common in the season of rain and winter as the visibility is decreased and

roads become slippery increasing the chances of accidents.

**Table 8: Showing comparison of effect of weather conditions on RTA among various studies.**

S.no	Study	Predominant season
1	Chandrakant et al <sup>10</sup> (2002)	December
2	Nilambar Jha et al <sup>12</sup> (2004)	July
3	Pangiotidis et al <sup>13</sup> (2004)	December
4	Present study	January

*Diurnal variations*

From the Table 9, it can be understood that the incidents of RTA are more during daytime in different studies.

**Table 10: Showing different types of vehicles involved in RTA in different studies.**

Sl. No.	Study	2 wheeler	3 wheeler	>4 wheeler	Others
1	Usha Vasu et al <sup>16</sup> (2002)	49.2%	--	28.57%	20.22%
2	Choudhary et al <sup>17</sup> (2005)	54.54%	4.56%	40.9%	---
3	Markogiannakis et al <sup>18</sup> (2006)	60.8%	----	28.7%	10.5%
4	Present study	33.2%	15.00%	30.4%	21.4%

Final visual outcome in the present study is good and comparable to other studies as mentioned above. One of the important reasons is that the patients were brought to the emergency room and prompt and, adequate treatment was administered on time.

**Table 11: Comparison of final visual outcome among different studies.**

Visual acuity	Shtewi <sup>19</sup> et al	Usha et al <sup>16</sup>	Present study
> 6/18	61.2%	32%	59.2%
6/18 – 6/60	19.6%	4%	25.2%
< 6/60	19.2%	54%	15.6%

**CONCLUSION**

It can be concluded that the ocular injury following RTA is more common in younger age group (21-30 years) and in males. Lid is the commonest part involved. Driving under the influence of alcohol is an important etiology in this part of the country. Majority of the cases took place in the winter and festival months, suggesting the role of environment in the etiology of RTA. Incidence in daytime is higher than in the night hours. A significant section of the patients were driving two-wheelers and not following the safety precautions as advised, which calls for rigorous implementation of traffic rules. Last but not

**Table 9: Showing comparison of diurnal variations among various studies.**

S. No.	Study	Time of day when maximum accident reported
1	Kuhn F et al <sup>14</sup> (1994)	Day
2	Pangiotidis et al <sup>13</sup> (2004)	Day
3	Ganveer et al <sup>15</sup> (2004)	Day
4	Present study	Day

*Mode of transport and other factors*

In the present study, it is observed that 2 wheelers are the common type of vehicle involved in RTA and it is comparable with the studies enlisted in the Table 10.

the least, it is often said that the prevention is the best way to minimise such unwanted events. Public sensitisation, strict adherence to traffic rules and improved roads are some of the few steps that can go a long way to reduce such events.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Das S, Bhuyan D, Addya S. Ocular morbidity following road traffic accidents: a retrospective analysis. *Int J Community Med Public Health* 2017;4:968-72.