ORIGINAL RESEARCH PAPER
Volume-9 | Issue-2 | February-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

# A CLINICAL STUDY OF ROAD TRAFFIC ACCIDENTS RELATED OCULAR INJURIES IN A RURAL TERTIARY CARE HOSPITAL

Ophthalmology

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## ABSTRACT

In this study we evaluated the epidemiology and pattern of ocular injury among road traffic accident cases. This cross sectional prospective study was conducted in a rural tertiary care hospital in eastern India. The data collected were demographic variables, mode of travel while sustaining injury, presenting complaints, time interval between injury and reporting to the hospital, whether injured person was driver, rider or pedestrian. The detailed ophthalmic examinations with type and extend of ocular injury was documented. The best corrected visual acuity at the end of 6 months graded as good (visual acuity >6/18), fair (6/18-6/60) or poor (<6/60).

In this study 346 patients and their 373 eyes were included. The right eye injury was noted in 197(52.8%) cases, left eye injury in 153(41.0 %) cases and 23(6.2%) patients had bilateral ocular injuries. There were 281(81.2%) male and 65(18.8%) female cases. The commonest affected age group was 21-40 years with 178(51.4%) cases. Most of the affected victims were unemployed youth 112(32.4%). Most common time interval between injury and reporting to our hospital was 12-24 hrs of 156(45.1%) cases. The subconjunctival hemorrhage in 114(30.6%) eyes was the commonest type of ocular injury detected in our study. The conservative treatment was done in 281(75.3%) eyes while 92(24.7%) eyes required surgical repair. The final good visual acuity was documented in 314 (84.2%) eyes and only18 (4.8%) eyes had poor visual acuity.

This study enhances our understanding of ocular injuries in road traffic accidents. Awareness about road safety, safe road infrastructure and enforcement of safety laws can minimize ocular injuries and its consequences on vision.

## KEYWORDS

road traffic accident, ocular injuries, blindness

## INTRODUCTION

Road traffic accidents are responsible for a major proportion of human suffering in the world and according to the world health organization it is the sixth leading cause of death in India.[1] India has one of the largest road networks in the world. A lot of changes have taken place on the transport system of our country. The steady population growth, better financial condition of population with government sponsored schemes, easy vehicle loans from the financial institutes has resulted in enormous increase in number of vehicles on the roads for transportation in India. In both urban and rural area lack of footpaths, service lanes, cycle tracks where non motorized transport blend with motorized traffic increases the risk of accidents. Ocular trauma due to road traffic accidents are reported more now-a-days. In India, total number of reported road traffic accidents were 4, 86,476 in 2013 and number of accidents per lakh population was 39.6 in the same year. [1]So, road safety is an issue of national concern considering its negative impacts on economy, public health and welfare of the people.

The ocular trauma can cause severe and permanent visual impairment owing to delicate and complex architecture of the eye.[2] The ocular trauma are the most common cause of monocular low vision and blindness. [3] The high socio-economic cost of the ocular injuries due to road accidents needs effective policies for curbing the accidents. Today, 2.4million ocular injuries occur in each year and 90% of all ocular injuries are preventable. [4] The ocular trauma is one of the leading causes of preventable blindness in the world. [4, 5] Therefore, early detection and treatment is the key for ocular trauma management to prevent complications.

The ocular injuries are classified according to World Health Organization (WHO) and Birmingham Eye Trauma Terminology System (BETTS) [6] as extraocular and intraocular. Intraocular injuries are further classified as closed globe injury (partial thickness wound in the eyeball wall) as contusion or lamellar laceration and open globe injury(full thickness wound in the eyeball wall) as rupture involving blunt trauma, or laceration, penetrating or perforating injury or intraocular foreign body involving sharp forces. Adenexal injuries involve eyelid and/or conjunctiva. The zone I, II or III injury are classified according to the involvement of area of eyeball from anterior to posterior pole of the globe. The severity of extraocular and intraocular closed globe injury was classified into mild, moderate and severe according to the classification of Duke Elder. [7] Intraocular open globe injuries were classified into mild, moderate and severe according to classification by Vasu et al which was adapted from Organ Injury Scaling VII described by the American Association for the Surgery of Trauma. [8]

Our hospital covers about five million mostly rural populations. No previous study had been done on epidemiology and pattern of ocular trauma in road traffic accident cases in our study area. Therefore, considering road traffic accidents a serious burden to our community, this study will provide useful information on magnitude, pattern of ocular injuries among accident cases and will serve as the basis for designing, implementing preventive measures by the appropriate authorities.

## MATERIALS AND METHODS

This is a cross sectional noninterventional hospital based study conducted to find out epidemiology and pattern of road traffic accident related ocular injuries examined in the ophthalmology department and emergency unit of our hospital from January 2018 to December 2018.The ethical clearance from the ethical board of the institute was taken for the study. A detailed history of each case was taken. The data collected were recorded in a pretested proforma from the conscious patients and from their relatives in unconscious patients. We have documented the epidemiological data, nature and extent of ocular injury in all consecutive road traffic accident cases. We enquired about presenting complaints, time interval between injury and reporting to hospital, whether injured person was driver, rider or pedestrian, history of any treatment received, intake of alcohol and whether using helmet or not, at the time of accident. The patients with history of ocular injuries from other causes were excluded from the study.

Each eye was examined separately. The type and extend of ocular injury was documented. The visual acuity was assessed with Snellen's chart and finger counting or perception of light (PL) according to the subject's condition. We also noted reaction of pupil to exclude presence of relative afferent papillary defect (RAPD) or not in the affected eye. The detailed ophthalmic examination of all the patients were done with slit lamp examination, 90D examination and indirect ophthalmoscope examination. Ultrasonography B-scan was done in patient's hazy media which prevented detailed fundus examination. X ray of orbit (AP and Lateral view) and computerized tomography (CT) scan were done in suspected cases of orbital and periorbital injuries. The best corrected visual acuity at the end of 6 months was considered as the final visual outcome. The best corrected visual acuity at the end of 6 months was measured with a Snellen's chart and graded as good ( visual acuity >6/18), fair ( 6/18-6/60) and poor (<6/60). Statistical software SPSS version 20.0 was used to analyze the data of the study.

## RESULTS

In this study 346 patients and their 373 eyes were studied. The right eye

injury was noted in 197(52.8%) cases, left eye injury in 153(41.0 %) cases and 23(6.2%) patients had bilateral ocular injuries. There were 281(81.2%) male and 65(18.8%) female cases with the ratio of 4.32:1. The commonest affected age group was 21-40 years with 178(51.4%) cases followed by 41-60 years age group of 113(32.7%) cases, above 60 years with 34(9.8%) patients and least affected age group was below 21 years age group of 21(6.1%) cases. Most of the affected victims were unemployed youth 112(32.4%).Most common presenting complaint was pain in 236(68.2%) cases, time interval between injury and reporting to the hospital was 12-24 hrs of 156(45.1%) cases, most common injured person was the drivers 189(54.6%)(Table-1).

**Table-1: Age, sex, occupation, mode of travel, presenting complaints, time interval between ocular injury and reporting to the hospital and type of injured persons**

| | No. of patients (n= 346) | Percentage |
|---|---|---|
| Age distribution(years) | | |
| <20 | 21 | 6.1 |
| 21-40 | 178 | 51.4 |
| 41-60 | 113 | 32.7 |
| > 60 | 34 | 9.8 |
| Sex | | |
| Male | 281 | 81.2 |
| Female | 65 | 18.8 |
| Occupation | | |
| Students | 67 | 19.4 |
| Agriculture workers | 92 | 26.6 |
| Businessman | 34 | 9.8 |
| Unemployed | 112 | 32.4 |
| Others | 41 | 11.8 |
| Mode of travel | | |
| Two wheeler | 183 | 52.9 |
| Four wheeler | 35 | 10.1 |
| Auto | 18 | 5.2 |
| Cyclist | 82 | 23.7 |
| Pedestrian | 28 | 8.1 |
| Presenting complaints | | |
| Pain | 236 | 68.2 |
| Swelling | 27 | 7.8 |
| Redness | 70 | 20.2 |
| Diplopia | 13 | 3.8 |
| Duration of presentation to the hospital | | |
| < 12hrs | 57 | 16.5 |
| 12-24 hrs | 156 | 45.1 |
| 24-48hrs | 107 | 30.9 |
| >48hrs | 26 | 7.5 |
| Type of injured person | | |
| Driver | 189 | 54.6 |
| Motorcycle rider | 93 | 26.9 |
| Pedestrian | 64 | 18.5 |

Out of 373 eyes in 346 patients, 272(72.9%) eyes had visual acuity 6/6 to 6/18 and 03( 0.9%) eyes had visual acuity of no perception of light(PL) at presentation(Table-2).

**Table-2: Visual acuity at presentation of patients**

| Visual acuity | Number | Percentage |
|---|---|---|
| 6/6 -6/18 | 272 | 72.9 |
| 6/24-6/60 | 63 | 16.9 |
| 6/60-3/60 | 24 | 6.4 |
| <3/60- PL+ | 11 | 2.9 |
| No PL | 03 | 0.9 |
| Total | 373 | 100 |

The sub conjunctival hemorrhages in 114 (30.6%) eyes was the commonest type of ocular injury detected in our study followed by eyelid ecchymosis in 84(22.5%) eyes. There were eyelid laceration in 36 (9.7%) eyes, corneal tear in 30 (8.1%) eyes and orbital wall fracture in 2 (0.1%) eyes (Table-3).

**Table-3: Type of ocular injuries**

| Structures | Type of injury | Number of eyes | Percentage |
|---|---|---|---|
| Eye brow | Contusion | 06 | 1.6 |
| Eyelid | Ecchymosis | 84 | 22.5 |
| | Laceration | 36 | 9.7 |
| Conjunctiva | Subconjunctival hemorrhage | 114 | 30.6 |
| | Tear | 08 | 2.1 |
| Conjunctiva/Cornea | Foreign body | 15 | 4.1 |
| Cornea | Abrasion | 27 | 7.2 |
| | Tear | 30 | 8.1 |
| Anterior chamber | Hyphaema | 16 | 4.4 |
| Iris | Prolapsed/Torn | 04 | 1.1 |
| Lens | Cataract | 05 | 1.3 |
| Sclera | Tear | 13 | 3.6 |
| Vitreous | Hemorrhages | 06 | 1.7 |
| Retina | Commotio retinae | 04 | 1.1 |
| Optic nerve | Injury | 03 | 0.8 |
| Orbit | Fracture | 02 | 0.1 |
| Total | | 373 | 100 |

The conservative treatment was done in 281(75.3%) eyes while 92(24.7%) eyes needed surgical repair of the eyelid, cornea and/or sclera, hyphaema aspiration, cataract extraction with IOL implantation and some cases were managed by combination of various procedures (Table-4).

**Table-4: Management of ocular injuries**

| Type of management | Number(n=373) | Percentage |
|---|---|---|
| Conservative | 281 | 75.3 |
| Surgical | 92 | 24.7 |
| Lid repair | 36 | 39.1 |
| Repair of cornea | 23 | 25.0 |
| Repair of sclera | 06 | 6.5 |
| Repair of cornea and sclera | 07 | 7.6 |
| Repair of Iris | 04 | 4.3 |
| Hyphaema aspiration | 07 | 7.6 |
| Cataract extraction and IOL Implantation | 05 | 5.4 |
| Others | 04 | 4.5 |

The final good visual acuity was of 6/6 to 6/18 in 314 (84.2%) eyes and only18 (4.8%) eyes had poor visual acuity (Table-5).

**Table-5: Final visual acuity of the patients**

| Visual acuity | Number | Percentage |
|---|---|---|
| Good(>6/18) | 314 | 84.2 |
| Fair(6/18-6/60 | 41 | 11.0 |
| Poor(<6/60) | 18 | 4.8 |
| Total | 373 | 100 |

## DISCUSSIONS

Ocular trauma has been reported to be one of the major causes of ocular morbidity and preventable public health problem. It has been reported that one out of every twenty patients seen by an ophthalmologist is a case of ocular trauma. The ocular injury is the second leading cause a of hospitalization in ophthalmology ward after cataract [6] and it has severe effect on both family as well as on the society.

In our study, commonest age group of ocular injury was between 21-40 years with 178(51.4%) cases, the productive age group of the country is similar to the reports of the study of Arora AS et al [9]. In our study, male 281(81.2%) patients were more commonly affected than females. Gahlot A et al [10] have reported in his study the male to female ratio of 13.3:1. The higher number of ocular injuries in male patients noted in our study was due to the fact that most of the rural male population prefers to use motorcycle as the predominant vehicle for their transport. The right eye 197(52.8%) injury was more frequently noted in our study than left eye 153(41.0 %) similar to the reports of previous studies.[9] The time interval between injury and reporting to the hospital in our study was 12-24 hrs in 156(45.1%) patients. The main reasons for late presentation were the distance, financial constrain, ignorance of the health services available, late referral from primary and

secondary care institutes. Most studied from developing countries including India also similarly reported significant delay in seeking medical care by the ocular injury. Most of the eyes 281(75.3%) were managed conservatively and 92(24.7%) eyes required surgical intervention.

Out of 373 eyes in this study, subconjunctival hemorrhages in 114 (30.6%) eyes were most common ocular injury followed by 84(22.5%) eyes with eyelid ecchymosis. S Karanth S et al [11] had also reported similar observation in his study. The closed globe injuries were more common than open globe injuries in our study similar to the observations reported by Mittal G [12] and Arora AS et al [9]. In our study, 314 (84.2%) eyes had good visual acuity ( 6/6 to 6/18) and only18 (4.8%) eyes had poor visual acuity at the end of follow-up.

## CONCLUSION

The main aspects of road accident prevention and control strategy across the world have been on 4 E's - Education, Enforcement, Engineering and emergency care of the victims. In order to achieve a significant improvement in road safety, thrust should be given with multiple strategies to minimize road accidents about awareness about road safety, safe road infrastructure and enforcement of safety laws to prevent motorcycle accident related blindness.

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