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Epidemiology and pattern of motorcycle accident related ocular injuries in a rural tertiary care hospital in Eastern India

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Abstract

In this study we want to evaluate the epidemiology and pattern of ocular injury among motorcycle accident cases attending a rural tertiary care hospital in eastern India.

This cross sectional prospective noninterventional study was conducted in a rural tertiary care hospital in eastern India. The data collected were demographic variables, presenting complaints, time interval between injury and reporting to the hospital, whether injured person was motorcycle driver, rider or pedestrian, history of any treatment received, intake of alcohol and use of helmet at the time of accident. The detailed ophthalmic examination 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 671patients were included and total 697 eyes were studied. The right eye injury was noted in 386(57.5%) cases, left eye injury in 213(31.8%) cases and 72(10.7%) patients had bilateral ocular injuries. There were 632(94.18%) male and 39(5.82%) female cases. The commonest affected age group was 21-30 years with 231(34.4%) cases. Most of the affected victims were unemployed youth 229(34.1%). Most common time interval between injury and reporting to the hospital was 12-24 hrs of 397(59.2%). Only 273 (40.7%) patients were wearing a helmet at the time of accident and 256(38.2%) patients consumed alcohol before the incidence of accident. The eyelid ecchymosis in 219(31.4%) eyes was the commonest type of ocular injury detected in our study. The conservative treatment was done in 551(79.0%) eyes while 146(21.0%) eyes required surgical repair. The final good visual acuity was of 6/6 to 6/18 in589 (84.5%) eyes and only15 (2.2%) eyes had poor visual acuity.

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

Keywords: Accident, Motorcycle, Ocular injuries, Rural

Introduction

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 rural population with government sponsored schemes, easy vehicle loans from the financial institutes has resulted in enormous increase in number of motorcycles on the roads. Motorcycles are cheaper than automobiles; require less maintenance and gives better mileage per liter of fuel. Thus motorcycles are the most popular vehicle for transportation in both rural and urban areas of India as in most parts of Asia and other developing countries. In rural area lack of footpaths, service lanes, cycle tracks where nonmotorized transport blend with motorized traffic increases the risk of accidents. Ocular trauma due to motorcycle accidents are reported more now-a-days.

In India, total number of reported road traffic accidents were 4, 86,476 in 2013and number of accidents per lakh population was 39.6 in the same year.[(1)] The annual incidence of hospital admission for ocular injuries were 8.1, 12.6, 13.2 and 15.2 in United States,[(2)] Scotland,[(3)] Singapore[(4)] and Sweden[(5)] respectively. A study from rural area of Nepal reported the incidence of ocular trauma as 0.85 per 1000 males per year and 0.38 per 1000 female per year.[(6)] In 2013, our state, West Bengal ranked the tenth highest in the number of injured persons in road accidents in the country. In India, motorized vehicles were responsible for 94.5% of the total road accidents in the year 2013, amongst which two-wheelers accounted for highest share 26.3% of total road accidents in that 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.[(7)] The ocular trauma are the most common cause of monocular low vision and blindness.[(8)] 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.[(9)] The ocular trauma is one of the leading cause of preventable blindness in the world.[(9,10)] Therefore, early detection and treatment is the key for ocular trauma management to prevent complications. So, measures to create awareness about prevention of ocular trauma and its consequences would decrease traumatic ocular morbidity.

The ocular injuries are classified according to World Health Organization (WHO) and Birmingham Eye Trauma Terminology System (BETTS)[(11)] 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 of injury, zone I, II or III injury 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.[12] 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.[13]

Our hospital covers about five million mostly rural populations who use motorcycle as only mode of vehicle for their transport. No previous study had been done on epidemiology and pattern of ocular trauma in motorcycle accident cases in our study area. In the literature, only few articles on the ocular injuries resulting from motorcycle accident are available from India. Therefore, considering motorcycle accidents a serious burden to our community, this study will provide useful information on magnitude, pattern of ocular injuries among motorcycle 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 motorcycle accident related ocular injuries examined in the ophthalmology department and emergency unit of our hospital from January 2015 to December 2015.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 motorcycle 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 and Discussions

Ocular trauma has been reported to be one of the major causes of ocular morbidity and preventable public health problem.[14] It has been reported that one out of every twenty patients seen by an ophthalmologist is a case of ocular trauma.[15] The ocular injury is the second leading cause a of hospitalization in ophthalmology ward after cataract[11] and it has severe effect on both family as well as on the society.

In this study 671patients were included and total 697 eyes were studied. The right eye injury was noted in 386(57.5%) cases, left eye injury in 213(31.8 %) cases and 72(10.7%) patients had bilateral ocular injuries. Table 1 shows there were 632(94.18%) male and 39(5.82%) female cases. The commonest affected age group was 21-30 years with 231(34.4%) cases followed by 31-40 years age group of 194(28.9%) cases and least affected age group was above 70 years with 05(0.7%) patients. Most of the affected victims were unemployed youth 229(34.1%). Most common presenting complaint was pain in 403(60.0%) cases, time interval between injury and reporting to the hospital was 12-24 hrs of 397(59.2%) cases, most common injured person was the motorcycle drivers 356(53.0%). Surprisingly out of 671patients with ocular injury only 273 (40.7%) patients were wearing a helmet at the time of accident and 256(38.2%) patients consumed alcohol before the incidence of accident.

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

	No. of patients (n= 671)	**Percentage**
Age distribution(years)		
<10	07	1.0
11-20	143	21.3
21-30	231	34.4
31-40	194	28.9
41-50	56	8.3
51-60	21	3.2
61-70	14	2.2

>70	05	0.7
Sex		
Male	632	94.19
Female	39	5.81
Occupation		
Students	141	21.0
Agriculture workers	168	25.0
Businessman	71	10.6
Unemployed	229	34.1
Others	62	9.3
Presenting complaints		
Pain	403	60
Swelling	76	14.3
Redness	169	25.2
Diplopia	23	3.5
Duration of presentation to the hospital		
< 12hrs	86	12.8
12-24 hrs	397	59.2
24-48hrs	131	19.5
>48hrs	57	
Type of injured person		
Driver	356	53.0
Motorcycle rider	213	31.8
Pedestrian	102	15.2

Out of 697 eyes in 671 patients, 313(44.9%) eyes had visual acuity 6/6 to 6/18 and 05(0.7%) eyes had visual acuity of no perception of light(PL) at presentation(Table 2). The Table 3 of the type of ocular injuries shows eyelid ecchymosis in 219(31.4%) eyes was the commonest type of ocular injury detected in our study followed by subconjunctival hemorrhages in 155 (22.2%) eyes. The conservative treatment was done in 551(79.0%) eyes while 146(21.0%) eyes required surgical repair of the eyelid, cornea, sclera, cornea and sclera injury, hyphaema aspiration, lens removal with IOL implantation and some cases were managed by combination of various procedures(Table 4). The final good visual acuity was of 6/6 to 6/18 in 589 (84.5%) eyes and only15 (2.2%) eyes had poor visual acuity (Table 5).

Table 2: Visual acuity at presentation of patients

Visual acuity	Number	Percentage
6/6 -6/18	413	59.3
6/24-6/60	234	33.6
6/60-3/60	34	4.9
<3/60- PL+	11	1.5
No PL	05	0.7
Total	697	100

Table 3: Type of ocular injuries

Structures	Type of injury	No. of eyes	Percentage
Eye brow	Contusion	18	2.6
Eyelid	Ecchymosis	219	31.4
	Laceration	48	6.9
Conjunctiva	Subconjunctival hemorrhage	155	22.2
	Laceration	11	1.6
Conjunctiva /Cornea	Foreign body	22	3.2
Cornea	Abrasion	52	7.4
	Laceration	40	5.7
Anterior chamber	Hyphaema	28	4.5
Iris	Prolapsed/ Torn	06	0.9
	Traumatic uveitis	06	0.9
Lens	Cataract/ Dislocated	23	3.3
Sclera	Laceration	33	4.8
Vitreous	Hemorrhages	17	2.4
Retina	Commotio retinae	05	0.7
Optic nerve	Injury	03	0.4
Orbit	Fracture	07	1.0
Total		697	100

Table 4: Management of ocular injuries

Type of management	Number (n=697)	Percentage
Conservative	551	79.0
Surgical	146	21.0
Lid repair	48	32.9
Repair of cornea	17	11.6
Repair of sclera	10	6.8
Repair of cornea and sclera	23	15.8
Repair of Iris	06	4.1
Hyphaema aspiration	04	2.7
Lens removal and IOL Implantation	21	14.4
Others	06	4.1

Table 5: Final visual acuity of the patients

Visual acuity	Number	Percentage
Good(>6/18)	589	84.5
Fair(6/18-6/60	93	13.3
Poor(<6/60)	15	2.2
Total	697	100

In our study, commonest age group of ocular injury was between 21-30 years with 231(34.4%) cases, the productive age group of the country, is similar to the reports of the studies of Ezegwei IR,[7] Armstrong GW et al[16] and Arora AS et al.[17] In our study, male 632(94.18%) patients were more commonly affected than females 39(5.82%) with the ratio of 16.2:1. Gahlot A et al[18] have reported in his study the male to female ratio to be 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 (57.5%) injury was more frequently noted in our study than left eye (31.8%) similar to the reports of previous studies.[17,19,20] The time interval between injury and reporting to the hospital in our study was 12-24 hrs in 397(59.2%) 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 inj Out of 671patient, 273 (40.7%) patients used helmet at the time of accident and all the cases that had helmets at the time of accidents incurred mild type of ocular injuries. Therefore wearing a helmet decreased the chance of more serious type of ocular injuries. In this study, 256 (38.2%) had history of alcohol intake prior to the accidents while 415(%) had no history of its intake. Alcohol consumption was associated with higher incidence of motorcycle accidents. Most of the eyes 551(79.0%) were managed conservatively and 146(21.0%) eyes required surgical intervention. ury patients.[2]

Out of 697 eyes in this study, 219(31.4%) eyes had eyelid ecchymosis followed by subconjunctival hemorrhages in 155 (22.2%) eyes and were mild in nature with good visual prognosis. Alam J et al[15] had as reported similar observation in his study. The closed globe (551 eyes) injuries were more common than open globe (146 eyes) injuries in our study similar to the observations reported by Mittal G[22] and Arora AS et al.[17]

In our study, 589 (84.5%) eyes had good visual acuity (6/6 to 6/18) and only15 (2.2%) 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. The primary prevention approach of accidents though strict law enforcement for safe speed, avoidance of alcohol, wearing of proper helmet and propaganda of safe driving practices are needed to prevent motorcycle accident related blindness.

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