IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 1 Ser.11 (January. 2020), PP 05-09
www.iosrjournals.org

Pattern of Head Injuries due to Road Traffic Injuries involving Two-Wheelers in the Jurisdiction of NRS Medical College Morgue, Kolkata

Dr. Sandip Mukhopadhyay[1], Dr. Joydeep Khan[2]
1-Assistant Professor, Dept of FMT, NRSMCH, Kolkata
2-PGT,Dept of FMT, NRSMCH, Kolkata
Corresponding Author: Dr. Joydeep Khan

Abstract: *The study was conducted on 100 cases of fatal road traffic injuries of all age groups. The pattern and distribution of head injuries in dead bodies due to RTI with or without helmet and other associated risk factors was analyzed. A preponderance of victims in the age group 31-40 years (52%) with M:F ratio 7.33:1 was observed. 38% of cases of RTI died on the spot and 14% cases died while shifting or within one hour of admission to the hospital. 74% of victims were not using helmets. Majority died were the riders (84%), followed by pillion riders (14%). Contusion of the scalp was more common (98%) as compared to the laceration (38%). Contusion of brain was seen in 100% cases and laceration in 26% cases. Fissure fracture was seen in 64% cases. The commonest variety of intracranial hemorrhage was subdural (98%) followed by subarachnoid (96%).*

Key Words: *Road Traffic Injury, Head injury, Two wheelers*

Date of Submission: 06-01-2020 Date of Acceptance: 21-01-2020

I. Introduction

Accidents represent a major epidemic of non-communicable disease in the present century world over. They are a part of the price we pay for technological progress. India is undergoing major economic and demographic transition coupled with increasing urbanization and motorization. Motorized two wheelers being economical are very common mode of public transportation.With around 5,000 road accident deaths annually, West Bengal is among 13 states in the country recording maximum number of road mishaps, according to statistics of the Ministry of Road Transport and Highways. The number of persons killed per 100 accidents is at 51.4 per cent in the state, which is the fourth highest in the country, as per 2014 statistics. The mortality rate is steadily rising. The head and the abdomino-pelvic cavity have been looked upon as the most vulnerable region. Mortalities and morbidities are more common in head injuries for both riders and pillion riders of two wheelers. Since the head contains brain, a very important vital organ, trauma to this region challenges the individual because of its anatomical position, size, and movements in all directions. Despite improvements in safety measures in vehicles and greater availability of emergency measures, head injuries have not declined. Some of the factors that increase risks of RTA in India are lack of traffic laws, drunken and rash driving, traffic accidents due to negligent act, poor conditions of the road, lack of infrastructures, traffic mix, encroachments that restrict safe areas for pedestrian, and lack of valid or fake driving licenses. The aim of the present study is to find out the patterns and distribution of head injuries in deaths due to RTI with or without helmet and other associated risk factors and provide feedback for controlling such injuries.

II. Material & Method

This cross-sectional, descriptive, and non-randomized study for the period of one year was done on 100 cases of all age groups with history of road traffic accidents in and around Kolkata and where death had occurred within few hours to 16 days of admission to NRS Medical College, Kolkata. The bodies were sent to mortuary for conducting post-mortem examination. The inquest reports were studied for various details such as name, age, gender and brief history of road traffic accidents viz., site of death, time of death, use of helmet by riders, and period of survival. In case of incomplete history, enquiries were made with the eye witnesses, relatives, friends and police to ferret out relevant details. The postmortem examination of the victims was done in accordance with standard procedures. In hospital treated cases, case sheets were studied for details.

III. Observations and results

Table-1 shows age wise distribution of RTA victims. Out of the 100 RTA victims studied, there was a preponderance of victims in the age group 31-40 years (52%). There were only 2% cases in each age group of <10 years and >70 years. Majority of victims were males (88%) and females accounted for only 12%.

Table-2 shows site of death and survival time of victims after RTA. 38% of the victims died on the spot and 14% died while shifting or within one hour of admission to the hospital. 14% of the victims died within 1-24 hours of the admission. The mean duration of survival of a RTA victim was 2.20 days with a standard deviation of 3.96 days. The range of survival varied from 15 minutes to 16 days. Number of RTA victims died on the spot (38%) as compared to varied survival time was statistically significant ($p<0.001$). This indicates the serious impact of head injury leading to the spot death. None of the RTA victims in the present study had consumed alcohol at the time of accidents.

Table-3 shows use of helmet by riders of vehicles. Majority of victims did not use helmets (74%) and only 6% used helmets. However, no information was available from (20%) of the victims, whether they were using the helmets or not at the time of accidents. Majority of the victims died in this study were the riders (84%), followed by (14%) deaths of pillion riders, and in one case both rider along with pillion rider had died.

Table-4 shows injury to scalp, membrane and brain of RTA victims. Regarding type of injury, contusion of the scalp was most common (98%). The laceration of the scalp was noted in 38 (38%) cases. Almost similar findings were observed for contusion (94%) and laceration (32%) to the membrane. As far as injury to the brain was concerned, contusion was seen in 100% cases and laceration in only 26% cases. Overall, contusions were by far more common than lacerations.

Table-5 shows skull fractures and various types of intracranial haemorrhages in RTA victims. Comminuted fracture involving vault and base, and fissured fracture of vault was noted in 26 (26%) cases each. The fissured fracture of base was seen in 20% of the victims whereas 18% of the victims had fissured fracture of both vault and base. No fracture was observed in 10% of the victims. The commonest variety of intracranial haemorrhage was subdural haemorrhage (98%) closely followed by subarachnoid haemorrhage (96%). Intracerebral and extradural haemorrhages were present in 12% and 4% of cases respectively whereas intraventricular haemorrhage was reported in only 2% of cases. Interestingly, no instance of isolated intracranial haemorrhage was observed.

IV. Discussion

In the present study, a total of 50 cases of fatal RTA of all age groups and both sexes were studied for duration of one year. Highest incidence of fatalities occurred in the age group 30-40 years (28%) followed by 20-30 years (24%). Since the age group 20-40 years is the most active phase of life - physically and socially, and outnumbers the other road users, they therefore accounted for the maximum number of accidental deaths. Also, individuals of this age group were either students or prime bread earners of the family and thus remained outdoors during most of the day. Children below 10 years of age were least involved so also was the case with person beyond 70 years of age. This could be explained as the persons in extremes of the age usually remain indoors, whereas children are confined to the outskirts of the residential premises only. Our findings are in general agreement with those of other workers in the field [3, 4, and 5] who also reported maximum fatality by motorized two-wheeled vehicles (MTVs) in the age group 21-40. In contrast, a study by Sirathranout & Kasantikul [6] in Thailand noted the more vulnerable group to be below 21 yrs.

A preponderance of males over females with M/F ratio 7.33:1 was observed. It is due to greater exposure of males on streets and the personal and behavioral characteristics of male. In NCRB report of 2008, out of 23,552 RTA deaths, 20,420 (86.7%) were males and 3,132 (13.3%) were females [2]. Behera et al [3] in their study of 94 cases of motorcycle fatalities also noted that majority of cases (93.6%) were male as compared to female (6.4%) and M:F ratio 14.66:1 which is much higher ratio as compared to our findings. Our findings in general are well supported by other workers [5,6,7].

In our study, majority of the RTA victims (66%) died on the spot or brought dead to the hospital or died within 24 hours of the accident; 22% victims died within one week and rest 12% cases expired after one week despite getting adequate treatment. Our findings were well corroborated by other workers in the field. [3, 8, 9, 10, 11] Although Gupta et al [11] supported our findings with respect to the total number of deaths (61%) within 24 hours; yet the authors reported spot deaths in 22% of the cases, 3% on the way to the hospital and 36% of cases died within 24 hours of their admission in the hospital. Thus, our findings were at variance to their observations as we noted more cases of spot deaths (38%) and only 28% deaths were within 24 hours of admission including brought dead cases. This broad difference may be because of our study was confined only to occupants of two wheelers whereas the study of Gupta et al [11] encompassed all categories of vehicles on the road and pedestrians wherein the occupants of the bigger vehicles were relatively safe and stable as compared to that of two wheelers.

Majority of the deceased (74%) were not using helmet while riding at the time of accident. Only 6%

riders among deceased used helmets, which suggested that use of the helmet, can be lifesaving measure during an accident. Sirathranont and Kasantikul [6] noted that only 4% of the riders were wearing helmet at the time of accident which is in conformity with our observation. Pathak et al [8] in their study of 39 cases of two wheelers accidental deaths reported that 12.82% victims used helmet while 87.18% did not use helmet at all. Thus, death rate was noted to be higher in non-helmet users when compared to helmet users [3, 6, 8] a finding which is in concurrence to our observations. In contrast, Bahera et al [3] observed that among 78.72% deceased, 54.05% individuals wore helmet at the time of accident, and despite wearing helmet they were not fully protected from fatal injuries to head and neck which ultimately resulted in death. The chief purpose of helmet is to absorb the impact of a crash and prevent injury to the brain rather than preventing skull and face fractures. Moreover, comments pertaining to the quality of helmets can not passed for critical assessment for affording protection. Yet helmet use may ensure untreatable and irreversible injuries to a treatable and reversible injury type.

Mortality amongst riders (84%) was more compared to pillion riders (14%). Singh et al [10] reported more fatalities among pillion riders as compared to riders in contrast to our findings. In general, the riders have distinct disadvantage of almost having no physical protection moreover two wheelers are unenclosed, unstable and topple even on slight impact and make riders/pillions vulnerable to contact with hard road surfaces resulting in head injuries and fatalities.

In our study, we noted contusion of scalp, membrane and brain in 98%, 94% and 100% cases respectively. The incidence of laceration of the scalp, membrane and brain were observed to be 38%, 32% and 26% respectively. Khajuria et al [5] and Chaudhary et al [12] noted in their studies that laceration of brain tissue was highest among all brain tissue injuries which were contradictory to our observations, as we observed, incidence of contusion of brain tissue being the highest. 90% of the victims suffered fracture of the skull - either vault or base of the skull or both. Among the skull fractures, 64% sustained fissured fracture and 26% comminuted fracture. Probably this type of fracture is more common in cases where the head strikes with forcible contact with a stationary surface as in RTA. Our findings were well supported by Pathak et al [8] who reported in 120 cases of head injury deaths, linear fracture of the skull being the highest (43.04%). Khajuria et al [5] noted an incidence of 68.85% fracture of skull among 173 cases of head injuries.

The most commonly found intracranial haemorrhage was subdural haemorrhage (SDH) (98%) followed by subarachnoid haemorrhage (SAH) in 96% of the victims of RTA which coincided with the observations of the other researchers [5, 13, 14, 15, 16]. The study conducted by Gupta et al [11] revealed that subdural haemorrhage was the commonest type of intracranial haemorrhage (68%) supporting our observations; followed by extradural haemorrhage (28%) as second common and intracerebral haemorrhage least common (8%) whereas we noted subarachnoid haemorrhage being the second commonest that too with very high incidence (96%) and intraventricular haemorrhage being the least common (2%) contradicting their observations. Chandra et al [17] in their study in contrast to our observations found subarachnoid haemorrhage as the most common type of intracranial haemorrhage (66.9%) followed by subdural haemorrhage (58.2%).

References:-

[1]. **Park K.** Epidemiology of Chronic Non-communicableDisease and Conditions. In: Park's Textbook of Preventive and Social Medicine. 20th ed. M/s Banarsidas Bhanot Publishers, Jabalpur, India. 2009. p. 353.

[2]. Accidental Deaths and Suicides in India-2008. NationalCrime Record Bureau Report-2008. p. 13-14. http://ncrb.nic.in/ADSI2008/accidental-deaths-08.pdfaccessed on 12/05/2010.

[3]. **Bahera C, (Lt. Col.) Rautji R, Lalwani S and Dogra TD.** A comprehensive study of motorcycle fatalities in South Delhi. J Indian Acad Forensic Med. 2009; 31(1): 6-10.

[4]. **Dandona R, Kumar GA, Raj TS and Dandona L.** Patternsof road traffic injuries .in a vulnerable population in Hyderabad, India. Inj Prev. 2006; 12(3): 183-88.

[5]. **Khajuria B, Sharma R and Verma A.** A profile of theautopsies of road traffic accident victims in Jammu. J Clin Diag Res. 2008; 2(1): 639-42.

[6]. **Sirathranont J and Kasantikul V.** Mortality andInjuryfrom motorcycle collisions in Phetchaburi Province. J MedAssoc Thai. 2003; 86(2):97-102.

[7]. **Wladis A, Bostrom L and Nilsson B.** Injuries andmortalityin motorcycle and moped accidents in Sweden 1987-1994. Advanced age and male sex are risk factors of fatal moped and motorcycle accidents. Lakartidningen. 2003; 100(14): 1238-41.

[8]. **Pathak A, Desania NL, and Verma R.** Profile of roadtraffic accidents and head injury in Jaipur (Rajasthan). J Indian Acad Forensic Med. 2008; 30(1): 6-9.

[9]. **Singh H.** Pattern and distribution of injuries in fatal RoadTraffic Accidents in Rohtak. J Indian Acad Forensic Med. 2004; 26(1): 20-23. **Singh YN, Bairagi KK & Das KC.** An epidemiologicalstudy of road traffic accident victims in medicolegal autopsies. J Indian Acad Forensic Med. 2005; 27(3): 166-69.

[10]. **Gupta S, Roychowdhury UB, Deb PK, Moitra R and Chhetri D.** Demographic study of fatal cranio-cerebral roadtraffic injuries in North Bengal region. Medico-Legal Update. (2007-01 – 2007-03); 7(1). http://www.indmedica.com accessed on 14.10.2009.

[11]. **Chaudhary BL, Singh D, Tirpude BH, Sharma RK, Meel V.** Profile of road traffic accident cases in Kasturba Hospitalof MGIMS, Sewagram, Wardha, Maharastra. (2005-10-2005-12); 5 (4). http://www.indmedica.com accessed on 14.10.2009.

[12]. **Goyal M.** The correlation of CT scan and operative findingsin cases of head trauma. J Indian Acad Forensic Med. 2003; 25(4): 125-32.

[13]. **Singh H.** Pattern and distribution of injuries in fatal RoadTraffic Accidents in Rohtak. J Indian Acad Forensic Med. 2004; 26(1): 20-23.

[14]. **Kumar A, Lalwani S, Agrawal D, Rautji R and Dogra TD.** Fatal road traffic accidents and their relationship withhead injuries:

An epidemiological survey of 5 years. Indian J Neurotrauma. 2008; 5(2): 63-67.
[15]. **Menon A, Pai VK and Rajeev A.** Pattern of fatal headinjuries due to vehicular accidents in Mangalore. J Forensic Leg Med. 2008; 15: 75-7.
[16]. **Chandra J, Dogra TD, Dikshit PC.** Pattern ofCraniointracranial Injuries in Fatal Vehicular Accidents in Delhi. 1966-76: Medical Science Law. 1979; 19(3): 186-194.

Table 1: Age and Sex Distribution of Road Traffic Accidents Victims

Age (yrs)	**RTA victims No. (%)**
<10	02 (02)
11 – 20	12 (12)
21 – 30	24 (24)
31 – 40	28 (28)
41 – 50	16 (16)
51 – 60	10 (10)
61 – 70	06 (06)
>70	02 (02)
Total	100 (100)

Table 2: Survival Period

Sr. No.	**Survival Time**	**RTA Victims No. (%)**
1.	Died on the spot	38 (38)
2.	Brought dead to hospital or died within 1 hour of admission	14 (14)
3.	1 hour - 24 hours	14 (14)
4.	1 day – 1 week	22 (22)
5.	>1 week	12 (12)
Total		**100 (100)**

Table 3: Use of Helmet and Persons Died

Use of Helmet	**RTA victim No. (%)**	**Person died**	**RTA victims No. (%)**
No	74 (74)	Rider	84 (84)
Yes	06 (06)	Pillion rider	14 (14)
Data not available	20 (20)	Rider with pillion	02 (02)
Total	100 (100)	Total	100 (100)

Table 4: Head injury - Contusion and laceration of Scalp, Membrane and Brain

Type of injuries	**Scalp**		**Membrane**		**Brain**	
	Present	**Absent**	**Present**	**Absent**	**Present**	**Absent**
Contusion No. (%)	98 (98%)	2 (2%)	94 (94%)	6 (6%)	100 (100%)	0 (00%)
Laceration No. (%)	38 (38%)	62 (62%)	32 (32%)	68 (68%)	26 (26%)	64 (64%)

Table 5: Injury to skull and Types of Intracranial Haemorrhage

Sr. No.	Fracture of skull	RTA Victims No. (%)	Intracranial haemorrhage	RTA victims No. (%)
1.	Comminuted fracture of vault and base	26 (26)	EDH	04 (04)
2.	Fissured fracture of vault	26 (26)	SDH	98 (98)
3.	Fissured fracture of base	20 (20)	SAH	96 (96)
4.	Fissured fracture of vault and base	18 (18)	ICH	12 (12)
5.	No fracture	10 (10)	IVH	02 (02)
Total		100 (100%)		

Dr. Sandip Mukhopadhyay, et.al. "Pattern of Head Injuries due to Road Traffic Injuries involving Two-Wheelers in the Jurisdiction of NRS Medical College Morgue, Kolkata".*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(1), 2020, pp. 05-09.