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"The Fatal Head Injuries of Victim within 72 Hours from the Time of Road Traffic Accident - A Prospective Study".

[1]Laxmikanta Behera, [2]Niranjan Sahoo, [3]Bibhuti Bhusana Panda, [4]Mohan Kumar Hansda

[1]Assistant surgeon, capital hospital, Bhubaneswar
[2, 4]Assistant professor, Ims & sum hospital, Bhubaneswar
[3]Assistant professor, hi-tech medical college, Bhubaneswar

Abstract
Background*: Road traffic accident is any vehicular accident occurring on the road way. Death due to road traffic accident (RTA) is one of the leading causes of death in our country. Depending upon the severity of head injuries sustained in a Road traffic accident, death may occur at the spot within minutes to hours or in certain cases may be delayed for days to months. The gravity of head injuries, involvement of vital organs, immediate hospitalization, onset of treatment and quality of care are some of the important factors which decide the fate of the victim of accident. Keeping in view the above mentioned facts, the present study is taken up to analyze the fatal Head injuries of victim within 72 hours from the time of accident. Fatality in RTAs can be due to immediate causes like hemorrhage, injury to vital organs, vagal inhibition, neurogenic shock, embolism etc and late causes like infection, complication of injuries, mismatched blood transfusion etc.*
Materials used*: Dead bodies coming for the autopsy within 72 hours of RTA death.*
Observation*: The motorcycle-riders were found leading & most of the victims were not wore helmet and leads to fatal head injuries. Maximum case fatality resulted from injury to head & neck. Combination of Subarachnoid and Subdural hemorrhage are common among the victims of road traffic accidents.*
Conclusion*: Efforts should be made to make safer on roads and mandate/ educate drivers to adapt safe behavior during driving. Safety of riders, pillions and occupants and pedestrians should be an integral part of Road safety Programmed.*
Keywords: *Head Injury, road traffic accident, survival.*

I. Introduction

Road traffic accident is any vehicular accident occurring on the road way (i.e. originating on, terminating on, or involving a vehicle partially on the roadway).[1] Death due to RTA is one of the leading causes of death in our country. Depending upon the severity of head injuries sustained in a Road Traffic accident, death may occur at the spot within minutes to hours or in certain cases may be delayed for days to months. Several factors may be involved which influence the period of survival following a RTA. The gravity of head injuries, involvement of vital organs, immediate hospitalization, onset of treatment and quality of care are some of the important factors which decide the fate of the victim of accident. [2]

Fatality in RTAs can be due to immediate causes like hemorrhage, injury to vital organs, vagal inhibition, neurogenic shock, embolism etc and late causes like infection, complication of injuries, mismatched blood transfusion etc .[3] The indirect effect of skeletal injury which results in death like the fracture of the skull causing injury to the brain, fracture of the ribs piercing the heart/lungs, fracture of the long bones like femur leading to hemorrhage due to rupture of the large vessels etc. The skeletal injuries associated with injury to the vital organs and acute massive hemorrhages are more fatal or dangerous to life.[4]

In recent years deaths due to RTAs are increasing at an alarming rate throughout the world. Thereby it poses itself as a major epidemiological as well as medico legal problem. The problem of deaths and injuries as a result of road accidents is now acknowledged to be a global public health phenomenon. In 2002, global rate of death from road traffic injuries (RTA) was 19.2 per 10.000 populations.[5] According to an expert study group appointed by Government of India, "RTAs have come to be considered as the third deadly killer, next to heart disease and cancer."[6]

II. Material And Method

Keeping in view the above mentioned facts, the present study is taken up to analyze the fatal Head injuries of victim within 72 hours from the time of accident. The study has been taken up in the Department of FMT, M.K.C.G Medical College and Hospital during 1st October 2010 to 30th September 2012.

Inclusion criteria:

- All the dead bodies coming for the autopsy within 72 hours of road traffic accident death with a definite history of RTA.

Exclusion Criteria:

- The cases received for autopsy after 72 hours of road traffic accident death and cases without a definite history and information.
- The suspected case of RTA but on autopsy was not corroborative with RTAs.

Methods of Study:

All the relevant information regarding the cause and manner of death were collected from the available witnesses, relatives and other accompanying persons with the dead body. The relevant information as available on record either of police or of hospital were also collected in to the study and studied in a prospective manner.

III. Observation

In the ongoing study a total of 157 confirmed case of RTA where the death of the victim within 72 hours of the incidence out of 1780 cases of autopsy was done during the study period & 113 cases of Road traffic accident where the victim died more than 72 hours of accident.

Table- 1 Case Distribution Basing On Use Of Helmet By The Victims In Two Wheelers

POSITION OF THE TWO WHEELERS	TOTAL NO. OF CASES	HELMET USED	%AGE	NO HELMET	% AGE
DRIVER	66	05	7.57%	61	92.42%
PILLION	11	00	0%	11	100%

Table no.1 reveals that 77 motor cyclists were involved in road traffic accidents out of them 66 were drivers of motorcycle and 11 were pillions.

Table-2distribution Basing On Type Of Fatal Injuries On The Body

Region Of The Body	Single	%Age	In Combination	%Age
Head &Neck	54	34.39%	66	42%
Thorax	06	3.82%	41	26.11%
Abdomen & Pelvis	14	8.91%	57	36.3%
Lower Extremities	06	3.82%	43	27.38%
Upper Extremities	00	0%	15	9.55%

Table no 2 reveals that head & neck injuries were found in 54 cases (34.39%) in single and in 66 cases (42%) in combination with other body part injuries which is more common than other types.

Table -3 Distribution Basing On Fracture Of Different Skull Bone

Different Skull Bone	Individual	%Age	In Combination With Other Skull Bone	%Age	Total %Age
Frontal	27	17.19%	33	21%	38.19%
Parital	15	9.55%	45	28.66%	38.21%
Temporal	05	3.18%	27	17.19%	20.37%
Occipital	04	2.54%	26	16.56%	19.1%

Table no.3 depicts that frontal bone is found to be fractured alone in 27 cases and 33 cases in combination with other vault bone fracture, where as parietal bone was fractured in 15 cases alone and in combination with other vault bone fracture in 45 cases.

Table-4 Distribution Basing On Position Of The Victim Leading To Fatal Injuries On Different

Position Of The Victim	Head & Neck	%Age	Thorax & Abdomen	%Age	Extremities	%Age
Driver	65	41.4%	33	21.01%	27	17.19%
Pillion	12	7.64%	05	3.18%	00	0%
Occupant	14	8.91%	15	9.55%	11	7%
Pedestrian	28	17.83%	21	13.37%	16	10.19%
Total	119	75.79%	74	47.13%	54	34.39%

Table no.4 reveals that head & neck injuries are more common than all other types in spite of position of victim**.**

Table -5 Distribution Basing On Different Types Of Brain Injuries

Injuries	No Of Cases	% Age
Contusion	13	8.28%
Laceration	18	11.46%
Sah	10	6.36%
Edh	12	7.64%
Sdh	01	0.63%
Sah+Sdh	106	67.51%
Intracerebral	05	3.18%

Table no.5 reveals that Combination of subarachnoid and subdural hemorrhage is common among the victims of road traffic accidents suffering from head injuries.

Table- 6 Distributation Basing On Cause Of Death

Cause Of Death	No.Of Cases	%Age
Neurogenic Shock	30	19.1%
Shock & Hemorrhage	123	78%
Embolism & Other Causes	04	2.5%

Table no 6 shows that out of 157 cases shock and hemorrhage is the cause of death 123cases (78%), where as neurological shock causes death in 30 cases (19.1%) and embolism and other causes are responsible in minor number of the cases (2.5%).

IV. Discussion

The cases within 72 hours comprise of 41.86% of total fatal accident cases. This can be attributed to poor transport of victims from scene of accident to referral center and lack of multi-trauma units and proper infrastructure.

Two wheelers are more involved in road traffic accidents because two wheelers as mode of transportation are very convenient and simple to use. It is used for travelling fast between two destinations due to fact that modes of public transport are vastly inadequate for general people. This study reveals that 76 motor cyclists were involved in road traffic accidents out of them 66 (86%) were drivers of motorcycle and 11were pillions. In 92.42% of case drivers does not wore helmet only 7.57% of drivers wore helmet. This was consistent with the study done by Shiv Kumar et al[1].[6] Where mortality amongst riders (84%) was more compared to pillion riders (14%) and the study by Jain Animesh et al (2009)[7] shows 71.11% of victims were riders and pillions of the two wheelers. The results were slightly higher than the study by Khade A et al (2012)[8] where 34.78% victims were of motorized two wheelers. This is because two wheelers are more unstable when compared to other vehicles and more prone to accidents. Drivers are more susceptible to fatalities due to higher vulnerability during accidents and inability to escape from the motor cycle due to seating pattern. Helmet is protective but poor enactment of traffic laws and ignorance of drivers of effectiveness of helmet leads to higher fatalities.

In the present study head & neck injuries were found in 54 cases (34.39%) in single and in 66 cases (42%) in combination with other body part injuries. Thorax was involved in 06 cases individually and 41 (26.11%) cases in combination. Abdomen and pelvis was involved in 14 cases individually and in 57 cases (36.3%) in combination. Lower extremity was involved in 06 cases individually and in 43(27.38%) cases in combination, whereas upper extremity was involved in 15 (9.55%) cases in combination. This study was similar with the study done by Singh H et al (2007)[9] where head injury 56.6%, abdomino-pelvic organ 9%, thoraco-abdominal 8.5%, limb fracture 7.8% as because maximum drivers are not using helmets may be the leading cause of head injury, as it appears from the study that very few peoples use to wear helmet during driving. Driving after consuming alcohol may also lead to lack of control, equilibrium and decreased reflexes of the body leading fatal head injuries. When fracture of the skull bone is taken in to account, frontal bone is found to be fractured alone in 27 cases (17.19%), 33 cases in combination with other vault bone fracture, and in total 38.19% cases. Whereas the parietal bone alone was fractured in 15 cases (9.55%), in combination with other vault bone fracture in 45 cases and in total in 38.21% cases. Temporal bone is fractured in 05 cases (3.18%) individually, in 27 cases in combination and in total 20.37% cases. Occipital bone was fractured in 04 cases individually, in 26 cases in combination and in total 19.1% cases. Similar results were obtained by study done by Gupta S et al (2007)[10] where temporal bone was fractured in 45.45%, parietal bone in 39.3% of cases, frontal bone in7.5% cases, occipital bone in 65 cases. Different results were found by different authors as in Kumar A et al (2008)[11] where temporal bone fractured in 47.25%, occipital bone in 42.01%, parietal bone in 45.47%, frontal in 33.64% and sphenoid in 20.03%, as compared to Sharma BR et al (2003)[12] where fracture of frontal bone alone is 2.48% and in combination 6.50%, parietal bone 5.88%alone and in combination

33.81%, temporal 4.02% alone and in combination 28.29%. Goel S et al (2011)[13] stated that frontal bone was fractured in 33% cases, parietal bone in 21% cases, and temporal bone in 21% cases.

On studying the different injuries sustained on different parts of body as regards to the position of the victim. Drivers are found with head & neck injuries in 65 cases (41.4%), thorax & abdomen in 33cases (21.01%) and extremity injuries in 27 cases (17.19%). The pillions were having head & neck injuries in 12 cases, thorax & abdomen injuries in 05 cases (3.18%) whereas occupants with head and neck injuries in 14 cases (8.91%), injuries to abdomen and pelvis in 15 cases (9.55%), injuries to extremity occurred in 11 cases (7%). Pedestrians with head injuries occurred in 28 cases (17.83%), thorax and abdomen injuries in 21 cases (13.37%) and extremity injuries in 16 cases (10.19%). Total 75.79% victims are with head and neck injuries, 47.13% victims are with thorax and abdominal injuries and 34.39% victims are with extremity injuries. Different results were obtained by different authors, however the findings were little higher than the study done by Sharma BR et al (2003)[12] where head injury was found in 68% of pedestrians, 80% in motor cyclists, 43% in cyclists, Kuchewar SV et al (2012)[14] where 50% victims were succumbed to head injuries, Singh H et al (2007)[9] where head injury was found in 80% cases, lower limb fracture in 42.6% cases and chest injury in 38.8% of cases.

In relation to fatal injuries found on the brain in maximum cases combination of Subarachnoid and Subdural hemorrhage is found i.e. 106 cases (67.51%) , contusion of brain was found in 13 cases(8.28%), laceration in 18 cases (11.46%), subarachnoid hemorrhage in 10 cases (6.36%), Extradural hemorrhage occurred in 12 cases(7.64%), Subdural hemorrhage in 01 cases(0.63%), and Intra cerebral injuries in 05 cases(3.18%). So combination of Subarachnoid and Subdural hemorrhage is common among the victims of road traffic accidents suffering from fatal head injuries. My study was quite similar with **Gupta S et al (2007)[10]** where Extradural hemorrhage was found in 26.92% cases, Subdural hemorrhage occurred in 65.38% and Akang AA et al (2001)[15] where subdural hemorrhage - 62.4%, sub arachnoids hemorrhage 24.6 and Goel S et al (2011) [13] where subdural hemorrhage found in 65% cases, subarachnoid hemorrhage in 31%. This was slightly higher than the study done by Sharma BR et al (2003)[12] where cerebral contusion and laceration found in 23.71%, subdural hemorrhage in 62.40, Dhattarwal SK et al (2004)[16] where subdural hemorrhage is seen in 44.7% cases, sub arachnoids hemorrhage in 34.7% cases. Contusion and laceration of the brain is seen in 24.2% of cases, Kumar A et al (2008)[11] and Shiv Kumar et al[6] stated subdural hemorrhage in 89.11% cases.

In maximum cases shock and hemorrhage is the cause of death 78% out of 157 cases. Neurogenic shock is the cause of death in 30 cases (19.1%) and death due to embolism and other causes in 2.5% cases. The findings were little lower in the study done by Khajuria B et al (2012)[17] where Hemorrhagic shock is the cause of death in 24.49% cases, and head injury is the cause of death in 69.48% cases. The findings were higher than the study Jagannatha SR et al (2012)[18] where shock& hemorrhage is the cause of death in 51.66% cases and combined head injury and hemorrhage in 43.33% cases, Bansal S et al (2001)[19] where hemorrhage and shock is the cause of death in 47% cases . It may be attributed to lack of emergency trauma care, blood transfusion facility and easy availability of operational interventional and diagnostic techniques. More-ever the economic burden on lower socioeconomic groups also plays a hindrance to treatment aspect that is required.

V. Conclusion

- The motorcycle-riders were found leading at 42.67% & most of the victims were not wore helmet (74%) and leads to fatal head injuries.
- Maximum case fatality resulted from injury to head & neck i.e. (34.39%) in single and (42%) in combination with other body part injuries.
- Parietal bone is fractured in 38.21% cases and frontal bone in 38.19% cases.
- Combination of subarachnoid and subdural hemorrhage common among the victims of road traffic accidents suffering from head injuries.
- Fatal injuries were always received in multiple regions of body. Head and chest being most commonly involved.

Steps suggested for prevention:

In the coming years, the numbers of vehicles on the roads are likely to increase phenomenally along with increase in Road traffic volumes as a whole. Hence, efforts should be made to make safer on roads and mandate/ educate drivers to adapt safe behavior during driving. Safety of riders, pillions and occupants and pedestrians should be an integral part of Road safety Programme. To promote safety on the road some specific known/proven interventions should be adopted soon.

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