

PATTERN OF FATAL CRANIAL INJURIES AUTOPSIED AT TERTIARY CARE MEDICAL COLLEGE HOSPITAL OF NORTH KARNATAKA – PROSPECTIVE STUDY.

*Inamdar P.I., **Prabhawati P.I., ***Pawar G.S.

Abstract

Injuries are responsible for major cause for unnatural deaths, amongst them; head injury is the commonest cause of death. A postmortem study of 89 cases died due to head injury was conducted in a District Hospital Mortuary Belagaum for a period one year. Majority of the cases (78.6%) were due to RTA, followed by (11.2%) railway accidents, young males (31.4%) were most commonly injured, common victims were drivers of the vehicle (45.8%). History of alcohol consumption present in 24.7% cases. Commonest body part involved was head (70.7%). Of these 60.6% died immediately and 31.8% died within 24hrs.

© 2013 Karnataka Medico Legal Society. All rights reserved.

Keywords: Head injury, RTA, Drivers, Railway accidents, Alcohol

Introduction:

Mankind has seen urbanization, mechanization, industrialization, changing social values and increasing crime, these resulted in the instances of accidents, assaults causing loss of many human lives every year. Head being the most prominent exposed part of human body, is involved in many situations like trauma due to accidents, suicide and homicides. The morbidity and mortality due to them can be reduced by adopting proper scientific precautionary measures.

Most of the Indian roads are congested, overcrowded making smooth movement of the traffic a difficult task. Growing disrespect for

rules & regulations, are also contribute towards the accidents in the form of in mad race, craze for speed, fancy for powerful vehicles along with use of illicit drugs or alcohol while driving. The mechanics, diagnosis and treatment of head injuries is a great challenge for the treating doctor. So it is very important for a forensic pathologist to give opinion of the fatal injuries based on the proper PM examinations and other relevant factors.

District hospital being a referral centre located in the heart of city and a busy national highway nearby, several cases injuries due to RTA, assault, other accidents are brought for treatment. Many of these cases would have head injuries along with other injuries. Data on the head injuries in India is very meager, this prompted us to consider and conduct the study of pattern of head injuries in medico-legal autopsies along with the survival period, age & sex, wise distribution, so that the entire data can be further made use by medical, medico legal and law enforcement authorities for various purposes.

-
- * Prof & Head, Dept. of Forensic Medicine & Toxicology, Hassan Institute of medical sciences & Research Centre, Hassan [KA]
** Reader Dept. of Paedodontics
Al-Ameen Dental College Bijapur.[KA]
*** Professor and Head, Dept Forensic medicine & toxicology,
Chennai Medical College, Trichy - 621105 [T N]

Corresponding author:

Dr. Inamdar. P.I., Prof & Head, Dept. of Forensic Medicine & Toxicology, Hassan Institute of medical sciences & Research Centre Hassan [KA] E mail

Material And Methods:

Total 89 cases of head injuries , prospective study were conducted at district hospital morgue Belgaum during the period 1999-2000.

The causes of fatal head-injuries and others injuries which were studied along with other parameters .Autopsy was conducted using standard autopsy techniques and all the findings were evaluated statistically in the form of tables and charts to arrive at various points.

Results and Discussion:

In the present study of 89 cases of fatal head injuries during 1999-2000 the peak incidence was between July and August with 26 cases (29.2%) consistent with E Ravikiran et al¹ & Kalyanaraman Ramamurthi B². Maximum numbers of cases were due to RTA (78.6%) is consistent with BH Tirupude³ & Maloney A.J.F Whatmore W.J⁴. Maximum number of victims were drivers of vehicles (45.8%) of which two wheel drivers were more than others (66.6%). Factors may be due to congested, ill maintained roads, and gross disregard to traffic rules by the road users. The second cause for head injuries came from railway accidents (11.2%) followed by assault (8.9%) and lastly by the fall from height (1.1%). Due to increasing population in India, the mass transit modes are getting over crowded both inside the vehicles as well on the platforms. Accidents happen during boarding or getting out of the train or bus.

Fall from height was one of the common cause of head injury in the studies by Kalyanaraman S & Murthy et al². Maloney A.J.F whatmore W.J⁴. In the current study Males were the commonest victims (78.6%) compared to females (21.0%) with a peak incidence (39.3%)

between the age group of 16-30 years which is consistent with Maloney A.J.F Whatmore W.J⁴. This period of life being the socially most active phase of human life, involving lots of outdoor activities, movements. While fulfilling the grueling demands of social life they may have to take risks and may fall victims of social hazards and accidents. Females, children and old age people are mostly restricted to indoors and are less exposed to the outside environment thus less vulnerable for injuries.

Amongst the RTA victims the vehicles drivers (45.8%) accounted for the most. Amongst the drivers it is the riders of two wheelers (66.6%) topped the chart. As the busy national highway is passing very closely to the town and RTA involving the drivers is common . The availability of fast and powerful two wheelers in the market, younger generation using them in a careless manner, poor road conditions with gross-disrespect for the traffic rules and regulations explain the involvements of the two wheelers drivers in the RTAs.

Consumption of alcohol was observed in 24.7% cases of fatal head injuries. It is very well known fact that the consumption of alcohol or any other such preparations can decrease the ability of a person to react in critical situations like accidents or assaults, Freytag E⁵.

The most common region involved was head in cases of RTA (78.6%) RA (11.2%) followed by Assault (8.9%) and in the fall from height (1.1%). This is consistent with studies by Devadiga⁶, in contrast with studies of Cooper P.R. et al⁷. In cases of assaults the perpetrator intends to kill the person by injuries. The most vital accessible and exposed part of the body i.e., head followed by other regions. Head being the

common part involved in cases of fall from heights is consistent with Teasdale G.M et al⁸.

In head injuries, scalp and face injuries were present in most of the cases (78.6%) and in skull fractures, the fissured type of fracture been the commonest (80.8%) followed by basal fractures (53.9%) is consistent with Adams et al⁹.

All age groups were uniformly affected as for as the fractures were compared indicating that all age groups are vulnerable for fractures.

Subdural haemorrhage (64%) was the commonest ICH irrespective of present or absence of skull fracture followed by SAH (60%) and (17.1%) of EDH cases were associated with fracture of skull it is consistent with Freytag E⁵.

Commonest brain injury was lacerations (52.8%) meninges measuring 06-60mm (38.3%) followed by contusions of the brain (33.7%). Frontal lobe contusions (93.3%) were common followed by parietal lobe (23.3%). In frontal lobe orbital surface contusions topped the list (43.3%) followed by lateral surface of temporal lobe (36.6%) consistent with Adams et al⁹.

Analysis of other regional injuries show that long bone fracture was the commonest (35.9%) followed by chest injuries (25.8%) consistent with Maloney & whatmore⁴.

In the present study 60.6% victims died instantaneously, 38% died within 24hrs. it is consistent with study done by B.H. Tirupude³.

The commonest cause of death was due to head injuries (44.9%) followed by shock and hemorrhage (41.5%) is consistent with E Ravikiran et al¹.

Summary and Conclusion

Present study of 89 cases of fatal head

injuries autopsied at District Hospital morgue can be summarized as follows.

RTA was the main causative agent responsible for head injuries. Male are commonly affected victims than females due to their active role in the society. Consumption of Alcohol was observed in many cases of fatal head injuries. Majority of them died within 24hrs from the time of incidence. Skull fractures are noted in majority of the victims with fissured fractures being the commonest one. Subdural haemorrhage was the commonest ICH. Lacerations were the commonest brain injuries.

Commonest cause of death was due to head injuries followed by shock and haemorrhage.

These injuries can be prevented by extensive public awareness with respect to proper road use, strict implementation of usage of helmet and traffic rules. This requires multi-disciplinary approach by doctors, police & judiciary for proper investigation of these cases. There is a need for Trauma Care Centers along the national highways for care and treatment of the victims with quick transportation facilities like air ambulance etc for the victims to be shifted for further treatment. The quality of the roads and mass transport has to be improved drastically. Head injuries need a multifaceted approach to tackle them to prevent the morbidity and mortality.

References

- 1) Ravikiran E .et al ;Prospective study on Road Traffic Accidents. JPAFMT 2004; Vol 4: P 12-16.
- 2) Kalyanraman S, Ramamurthy B; An analysis of 3000 cases of Head injuries.

- Text book of Neurosurgery. Ramamurthy B. National Book Trust India .1980; P217-19.
- 3) Tirupude B H; Patterns of Head Injuries JIAFM 1998; Vol: 20 No: 01, P9-12.
 - 4) Maloney A J F, Whatmore W J. Clinical and Pathological observations in fatal head injuries. A 5 year study of 172 cases. Br J Sur 1969; 56:23. P 51.
 - 5) Freytag E ;Autopsy findings in head injuries from blunt forces. Arch pathol. 1963; 75: P402-13.
 - 6) Devadiga K V, Jain S P ; Mortality in Head Injuries, A clinic-pathological study JAMA 1999; Vol 52 .P; 22-26.
 - 7) Cooper P R; Skull fracture & Traumatic fistulas in Greenfield's Neuropathology. 6th Ed .London Arnold publications. 1997, Vol 1. P 209-10.
 - 8) Teasdale G M, Galbraith S; Acute traumatic intracranial hematomas in Greenfields Neuropathology 6th Ed. London. Arnold publications. 1997; Vol 1: P 215.
 - 9) Adams. J ,Scott G .et al ; The Contusion index: A Quantitative approach to cerebral contusions in head injury in Greenfields Neuropathology 6 ed. London .Arnold publications. 1997; vol: 01 P 213.
 - 10) Rao B D, Subramanian M V et al ; Mortality in Acute Injury. Neurol India 1997; Vol 15 P 1.

Month	RTA	RA	Assault	Fall	Total	%
June -99	05	00	01	00	06	06.74%
July -99	11	00	00	00	11	12.35%
Aug -99	11	02	01	01	15	16.85%
Sept -99	04	00	01	00	05	05.61%
Oct -99	04	01	00	00	05	05.61%
Nov -99	08	02	00	00	10	11.23%
Dec -99	03	00	01	00	04	04.49%
Jan -00	06	01	00	00	07	07.86%
Feb -00	05	02	00	00	07	07.86%
Mar -00	04	00	01	00	05	05.61%
Apr -00	05	01	02	00	08	08.98%
May -00	04	01	01	00	06	06.74%
Total	70	10	08	01	89	100%
Percentage	78.6	11.2	8.9	1.1	100	100%
RTA-Road Traffic Accident, RA- Railway Accident						

Table 1 : Shows month wise analysis of mode of trauma

Mode of trauma	Male	%	Female	%	Total	%
RTA	60	67.4%	10	11.2%	70	78.6%
RA	06	6.7%	04	4.4%	10	11.2%
Assault	07	7.8%	01	1.1%	08	8.9%
Fall	01	1.1%	00	0.0%	01	1.1%
Total	74	83%	15	16.7%	89	100%
RTA-Road Traffic Accident, RA- Railway Accident						

Table 2 : Shows mode of trauma analysed with sex of individual.

Age groups (yrs)	Male	%	Female	%	Total	%
0-15	03	3.3%	02	2.2%	05	5.6%
16-30	28	31.4%	07	7.8%	35	39.3%
31-45	23	25.8%	04	4.4%	27	30.3%
46-60	14	15.7%	04	4.4%	18	20.2%
61-75	02	2.2%	02	2.2%	04	4.4%
Total	70	78.6%	19	21.0%	89	99.99%

Table 3: Shows the analysis of age groups with sex of individual.

Mode of trauma	Years					Total	%
	0-15	16-30	31-45	46-60	61-75		
RTA driver	00	07	03	09	00	14	15.7%
RTA occupants	03	21	17	07	03	56	62.9%
Railway accidents	01	04	03	00	00	10	11.2%
Assault	00	03	04	02	01	08	8.9%
Fall	01	00	00	00	00	01	1.1%
Total	05	36	27	18	04	89	100%

Table 4: Shows mode of trauma analysed with age.

Mode of trauma	Total cases	History of alcohol	%
RTA	70	18	25.7%
Driver	24	11	45.8%
occupants	40	04	10%
Pedestrians	06	03	50%
RA	10	02	20%
Assault	08	02	25%
Fall	01	00	00%
Total	159	40	24.7%

Table 5 : Depicting mode of trauma analysed with history of alcohol intake.

Survival time	Years					Total	%
	0-15	16-30	31-45	46-60	61-75		
Instantaneous deaths	03	23	17	09	02	54	60.6%
Death within 6 hours	02	10	04	07	00	23	25.8%
Death within 12hours	00	02	06	00	00	08	8.9%
Death within 24hours	00	00	00	02	01	03	3.3%
1day-1week	00	00	00	00	01	01	1.1%
Total	05	35	27	18	04	89	100%

Table 6 : Shows Survival time analysed with age groups.

Age group	Total cases in group	Extravasation of blood	Abrasions	Laceration	Incised/sutured injuries	In 84 cases <u>extracranial</u> injuries were noted
0-15	05	03	01	03	01	
16-30	35	32	11	23	07	
31-45	27	24	09	21	05	
46-60	18	09	07	10	04	
61-75	04	02	01	04	02	
Total	89	50	29	61	19	
%	100	83.3	34.5	72.6	22.6	

Table 6a : Shows extracranial injuries of face with age groups

Age group	Years					Total
	0-15	16-30	31-45	46-60	61-75	
Total cases	05	35	27	18	04	89
Skull fractures	04	27	21	15	03	70
%	80.0%	77.1%	77.7%	83.3%	75.0%	78.6%

Table 7 : Shows skull fractures analysed with age groups

Skull fractures	Fissure fractures	Depressed fractures	Depressed comminuted fractures	Basal fractures
RTA	60	09	20	38
RA	09	03	05	08
Assault	03	04	00	01
Fall	00	01	01	01
Total	72	17	26	48
%	80.8%	19.1%	29.2%	53.9%

Table 8 : Shows type of skull fractures analysed with mode of trauma.

Age group		Years					Total	%	% of cause with skull fracture	% of cause without skull fracture
		0-15	16-30	31-45	46-60	61-75				
With skull fracture	EDH	01	02	03	01	04	12	13.4%	17.1%	---
	SDH	02	13	17	16	01	49	55.0%	70.0%	---
Without skull fracture	EDH	00	01	00	00	00	01	1.1%	---	5.2%
	SDH	01	04	01	02	00	08	8.9%	---	42.1%
Total cases in group		04	20	21	19	05	70	100%	70.0%	19%

Table 9: Shows extradural haemorrhage (EDH) and subdural haemorrhage (SDH) in relation to skull fractures analyzed with age groups.

Age group	Years					Total	%
	0-15	16-30	31-45	46-60	61-75		
Subarachnoid haemorrhage	04	09	14	18	03	48	60.0%
Percentage of each group	8.3%	18.7%	29.15	37.5%	06.2%		

Table 10 : Shows subarachnoid haemorrhage analyzed with age groups.

Age group	Total cases in a group	Contusion	Laceration	Brain oedema	Parenchymal haemorrhage	Meningial Laceration	Brainstem injury
0-15	05	03	05	01	00	02	00
16-30	35	09	11	03	01	23	18
31-45	27	08	12	02	00	19	20
46-60	18	07	18	04	01	08	07
61-75	04	03	02	01	02	01	04
Total	89	30	47	11	04	53	49
%	100%	33.7%	52.8%	12.3%	4.4%	59.5%	55.05%

Table 11; : Shows brain damage analyzed with age groups.

Type of contusions	Number of cases	%
Fracture contusions	19	63.33%
Contrecoup contusions	16	53.33%
Coup contusions	02	6.66%
Parasagittal contusions	01	3.33%

Table 12 : Shows types of contusions of brain.

Site of brain	No. of cases	%	28 cases (93.3%)	30 cases (100%)
Frontal poles	8	26.6%		
Frontal lobe –orbital surface	13	43.3%		
Frontal lobe-lateral surface	7	23.3%		
Temporal poles	4	13.3%		
Temporal lobe-inferior surface	8	26.6%		
Temporal lobe-lateral surface	11	36.6%		
Sylvian fissure-corpus callosum	1	3.3%		
Perital lobes	7	23.3%	13cases (43.3%)	
Occipital poles	2	6.6%		
Occipital lobes	3	10.0%		
Cerebellum	2	6.6%		
Brain stem	2	6.6%		

Table 13 : Shows sites of contusions of brain.

Type/site	Fracture	Coup	Contre coup	Para sagittal	Total	%
Frontal lobe	15	01	08	01	25	83.3%
Temporal lobe	14	01	08	01	24	80.0%
Sylvian	00	00	01	00	01	3.3%
Parietal lobe	04	02	01	00	07	23.3%
Occipital lobe	04	00	02	00	06	20.0%
Cerebellum	01	00	02	00	03	10.0%
Brain stem	00	00	02	00	02	6.6%

Table 14: Shows comparison of sites of contusion with types of contusion of brain

Age group	Long bone	Rib cage fracture	Visceral iaceration/ Contusion	Pelvis fracture	Vertebral fracture	Others	In 53 cases other system injuries were found
0-15	02	01	00	00	00	00	
16-30	13	12	04	01	00	01	
31-45	10	08	06	02	01	00	
46-60	06	02	01	02	02	00	
61-75	01	00	01	02	01	01	
Total	32	23	12	07	04	02	
%	35.9%	25.8%	13.4%	07.8%	04.4%	02.2%	

Table 15 : Shows other system injuries analysed with age groups.

Age group (years)	Instananeous hair death	SHH	SHI	Others
0-15	03	01	01	00
16-30	18	04	13	01
31-45	13	01	13	00
46-60	06	03	08	01
61-75	00	01	02	01
Total	40	10	37	03
%	44.9%	10.1%	41.5%	03.0%
SHI –Shocks and Haemorrhage due to Multiple injuries SHH- Shocks and Haemorrhage due to Head injury				

Table 16 : Shows cause of death analysed with age groups.