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Original Review Article

Autopsy Study of Head Injury Cases in Road Traffic Accidents

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Key words
Road traffic injuries, Medicolegal Autopsy, Subarachnoid haemorrhage, Scalp Injury.

Abstract

Introduction: Road Traffic Injuries are one of the leading causes of deaths, hospitalizations, disabilities and socio economic losses in India. Head injury is associated with higher morbidity and mortality in patients with RTA. **Aim & objective:** To study the autopsy findings in head injury in patients with Road traffic accidents. **Methodology:** Present study was a cross sectional study carried out at a tertiary health care centre. The study included 200 Medico legal autopsy cases of road traffic accidents brought to tertiary care institution for autopsy. Data was collected with pre tested questionnaire. Data included demographic data of the person, epidemiological data and details of injury and autopsy findings. **Results & discussion:** Majority of the patients were from the age group of 21-30 years (29%) followed by 31-40 years (19%). Male to female ratio in our study was 2.7:1. Maximum number of road traffic incidents occurred between 6AM-9AM (28%) followed by 9AM-12Noon (18%). Most commonly found scalp injury was contusion 92(46%) followed by laceration 36 (18%). The most common autopsy finding in our study was subarachnoid haemorrhage 156 (78%) followed by subdural haemorrhage 146(73%). **Conclusion:** Head injury leading to intracranial haemorrhages is the leading to higher morbidity and mortality in patients with RTA.

1. Introduction

Various types vehicular accident occurring on the roadways are termed as Road Traffic Accident (RTA) i.e. originating on, terminating on, or involving a vehicle partially on the roadway.[1,2] Road traffic accident ranks among the top causes of death in the world and after Ischemic Heart disease.[3] The World Health Organisation (WHO) states that 1.24 million people die annually on the roads in its Global status report on road safety 2013.[4] India accounts for about 10 percent of road accident fatalities worldwide, 85% of all road accident deaths occurring in developing countries, and nearly half in the Asia-Pacific region.[5]

Sudden trauma to head leading to brain damage called as Transient Brain Injury (TBI) or acquired brain injury or simple head injury.

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TBI may occur if head hits violently and suddenly to a static or moving object) or if an object penetrates the Skull and injures brain tissue.[6] Population explosion and increase number of vehicles are major factors for increased rate of road traffic accidents. [7] In India, most of the deaths due to road traffic accidents (RTAs) take place within 24 h of injury, mostly before reaching the hospital. Delay in access to a health-care facility. The major problems of trauma care in India are first aid services scarcity, more transport time, delayed survivor's transfer to healthcare facility, no triage, and lack of adequate facilities to dealt with head injury cases promptly in most of the hospitals. These major contributing factors are leading to increased deaths due to road traffic accidents in India.[8-10]

Head was the most common site to be injured in road traffic accidents. Head injuries are more important because of location of brain in the skull. Though there is lot of advancement of technology and medical sciences, morbidity and mortality due to road traffic accidents has been increasing at an alarming rate. Correct knowledge and interpretation of head injuries in road traffic accidents will be helpful for policy decisions. Autopsy findings will be helpful for better understanding and treatment for the doctors.

Aim & objective: To study the autopsy findings in head injury in patients with Road traffic accidents

2. Material & methods:

Present study was a cross sectional study carried out at a tertiary health care Centre. Study population was all medico legal autopsy cases of road traffic accidents during the study period of one year. **Inclusion criteria:** 1. Institutional Medico legal autopsy cases of road traffic accidents. **Exclusion criteria:** 1. Decomposed bodies 2. Doubtful RTA cases. Institutional ethical committee approval was taken. A valid written consent was taken from the accompanied person of the patient after explaining study to them. Data was collected with pre tested questionnaire. Data included demographic data of the person, epidemiological data and details of injury. Thorough and complete autopsy was performed on the dead body and findings were recorded. While conducting autopsy, First, a thorough examination of the whole body with particular reference to head was made, then apart from opening the thorax and abdomen, the scalp was cut from one mastoid region to the other and was reflected forwards and backwards with a search for injuries and extravasation of blood in the layer of scalp. Then the skull was examined for fractures, after the skull cap was sawed and removed, a look for extradural haemorrhages was made above the duramater. Then the durameter was cut open on either side of midline to look for subdural and subarachnoid haemorrhage. Then the surface of brain was examined for contusions, lacerations, oedema, softening, infections etc. Then the brain was removed as a whole by cutting its basal attachments of nerves and vessels along with tentorium cerebella.

Spinal cord was cut as distal as possible then examined thoroughly with particular reference to contusions, lacerations, then duramater was stripped from the base of the skull and looked for any basal skull fracture. Coronal sections of cerebral lobes of brain from front to back, of 1 cm thickness were sliced to analyse any parenchymal pathology. Cerebellum and brain stem were cut horizontally into multiple slices in search of any parenchymal pathology. Then with all these findings, post mortem conclusion as to the cause of death in each case were drawn and recorded. The results were studied using appropriate statistical methods. Data analysis was performed by using SPSS 20 software. Microsoft word and excel were used for generating charts and graphs.

3. Results:

Fig. 1 shows distribution of patients according to age group. Majority of the patients were from the age group of 21-30 years (29%) followed by 31-40 years (19%). Patients from the age group of 41-50 were 13% and 51-60 years were 15%. Minimum patients were found in the age group of 0-10 years (3%) and above 80 years were 1%. (As mentioned in **Table no 01**). In our study, majority of the patients were male 146(73%) and 54(27%) were females. Male to female ratio in our study was 2.7:1. In our study we found that maximum number of road traffic incidents occurred between 6AM-9AM (28%) followed by 9AM-12Noon (18%). Between 12 Noon -3 PM we observed 11% cases. 15 % cases were found in 3 PM-6PM and 6PM-9PM each. Between 9PM-12 Midnight we observed 13% cases.

Out of total 200 patients 18 (9%) reached our institute within 1 hour i.e., the golden hour. Majority of the patients 110 (55%) reached our institute within 2-6 hour after injury. About 32 (16%) patients reached the institute in 6-24 hours. Among the 200 patients 120 (60%) died within first 24 hours. 30% died 2-7 days after reaching the hospital.

Table 2 showed distribution of head injury patients according to scalp injuries. Most commonly found scalp injury was contusion 92(46%) followed by laceration 36 (18%). Stitch wound was observed in 28 (14%) and crush injuries were observed in 22 (11%). Hematoma was observed in 12 (6%) patients. abrasions and puncture wounds were observed in 4% and 1% patients respectively. Chop wounds and incised wounds were not observed in any patient.

Autopsy findings in our study are shown in **table 3.** The most common autopsy finding in our study was subarachnoid haemorrhage 156 (78%) followed by subdural haemorrhage 146(73%). 18 (9%) patients had both SAH and SDH. Extradural haemorrhage was seen in 16 (8%) patients. Intraventricular haemorrhage was seen in 20 (10%) patients. 10 patients had isolated SAH without any intracranial damage.

Brain contusions were seen in 92 (46%). Skull fractures were observed in 126 (67%) patients. skull fractures included fissure fractures, depressed fractures, communited fractures and crush fractures. Most commonly observed fracture was fissure fracture (52/126) followed by depressed fracture (24/126). Least common fracture was base fractures (4/126). Four patients had isolated skull fracture without any other intracranial lesion.

Table 1: Distribution of head injury patients according to age group

Sr no	Age group (years)	No of patients	Percentage
1	0-10	06	3
2	11-20	16	8
3	21-30	58	29
4	31-40	38	19
5	41-50	26	13
6	51-60	30	15
7	61-70	16	8
8	71-80	08	4
9	>81	02	1
10	Total	200	100

Fig 1: Distribution of head injury patients according to sex

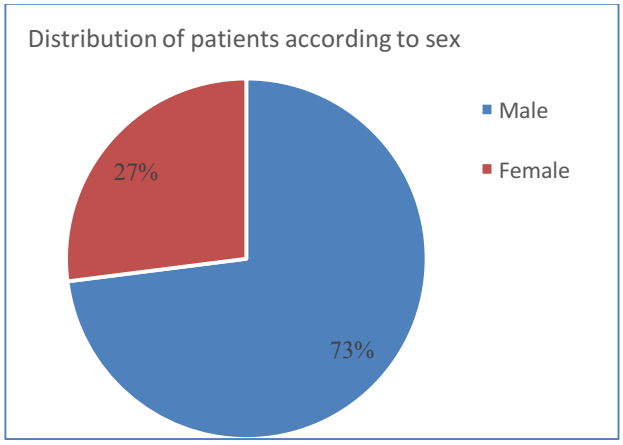

Table 2: Distribution of patients according to scalp injuries

Sr no	Scalp injuries	No of patients	Percentage
1	Contusion	92	46%
2	Laceration	36	18%
3	Stitch wound	28	14%
4	Crush	22	11%
5	Hematoma	12	6%
6	Abrasions	08	4%
7	Puncture wound	02	1%
8	Chop wound	00	0%
9	Incised wound	00	0%
10	Total	200	100%

Table 3: Distribution of head injury patients according to autopsy findings

Sr no	Autopsy findings of head injury	No of patients	Percentage
1	Extradural haemorrhage	16	8%
2	Subdural haemorrhage	146	73%
3	Subarachnoid haemorrhage	156	78%
4	Intraventricular haemorrhage	20	10%
5	Brain contusions	92	46%
6	Skull fracture	126	67%

4. Discussion:

In our study, Majority of the patients were from the age group of 21-30 years (29%) followed by 31-40 years (19%). Similar findings were seen in previous studies.[11-13] Persons in this age group are frequently outdoors due to social, educational and

job-related works. In our study, majority of the patients were male 146(73%) and 54(27%) were females. Male to female ratio in our study was 2.7:1. Similar findings were seen in previous other studies. [14-16] Males are more exposed to external environment as compared to females so the prevalence of RTA is more in males.

In our study we found that maximum number of road traffic incidents occurred between 6AM-9AM (28%) followed by 9AM-12Noon (18%). similar findings were seen in Singh H and Dhattarwal SK et al. [17]Lack of sleep, overnight continuous driving can be the causes for maximum occurrence of these cases. Morning hours are timings for school and office hours can be a contributing factor for the occurrence of accidents. Contrary to our study Menon A et al found that maximum number of accidents occur in evening hours. [18]

The most common autopsy finding in our study was subarachnoid haemorrhage 156 (78%) followed by subdural haemorrhage 146(73%). 18 (9%) patients had both SAH and SDH. Extradural haemorrhage was seen in 16 (8%) patients. Intraventricular haemorrhage was seen in 20 (10%) patients. similar findings were seen in Pathak et al. [11] The most common type of intracranial haemorrhage in their study was subdural haemorrhage (SDH) involving 83% followed by subarachnoid haemorrhage (SAH) in 28% cases and IVH in 17%. In a study by Amit M et al, least common type of head injury was EDH. [19]

5. Conclusion:

Head injury leading to intracranial haemorrhages is the leading to higher morbidity and mortality in patients with RTA.

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