



Profile of Death due to injuries over Head and Neck regions: An Autopsy based study from A Mortuary of a Teaching Hospital of West Bengal

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Abstract

Introduction: *Of all the regional injuries, those over the regions like, head and neck cause maximum morbidity and mortality.*

Objectives: *To assess the pattern and manner of injuries from autopsy profiles where death took place out of injuries over head and neck regions in cases where head and neck injury were the sole causes of death.*

Methodology: *A prospective mortuary-based study with repeat cross-sectional design was conducted for one year among all the dead bodies brought to the police morgue of Nilratan Sarkar medical college and hospital, where death was caused by injuries over head and neck regions. The sample size was 104. A pre-designed, pre-tested semi-structured questionnaire was used for data collection. Through external examination of the whole body was done and the surface injuries were noted with their fullest context. Color photographs were taken from different angles. Police inquest report was corroborated with the findings from clinical records, investigation reports &/or the surgical notes, if any.*

Results: *Road traffic injury was the most common cause behind fatal head and neck injuries. External injuries over face along with scalp hematoma and fissured fracture over skull were in majority. Temporal bone fracture was very commonly noted among the skull fractures and anterior cranial fossa was major site. Intracranial hemorrhage, especially subdural hemorrhage was commonly noted. In neck, trachea and carotid artery were commonly injured.*

Conclusion: *head and neck trauma, besides creating challenge towards medicos, carries a great concern for medico-legal experts also.*

Keywords: *autopsy, mortuary, inquest, medico-legal.*

Introduction

Head injury is defined by National Advisory Neurological Disease and Stroke Council as “a

morbid state resulting from gross and subtle structural changes in the scalp, skull, and/or the contents of the skull produced by mechanical

forces".¹ Of all regional injuries, those of the head and neck are very common. A reason behind it might be, head is the target of choice in the great majority of assaults involving trauma. In a relatively small area, head and neck accommodates the brain, special sense organs of vision, hearing, equilibrium, smell and taste, twelve pairs of cranial nerves and their plexuses, openings for the passages of air and food, the teeth and jaws for mastication, and many other vital structures.² The neck is least protected structure and is highly vulnerable to injuries. Thus any disease process or injury which may have direct or indirect effect on functioning of brain cells or interference of blood supply to the brain, the conduction of nerve impulse from brain to periphery will cause ill health, impairment of physiological process leading to adverse effect on other vital system which may terminate in death. Injuries over head may be produced by direct trauma by injury or indirect trauma by transmission of force. With this background, the current study was conducted to assess the autopsy profile including pattern and manner of injuries where death was direct attribution of injuries inflicted over head and neck regions in cases where head and neck injury were the sole causes of death.

Materials and Methods

A prospective mortuary-based study with repeat cross-sectional design was conducted for one year (1st April, 2015-31st March, 2016) among all the dead bodies where death was caused by injuries over head and neck regions and brought to the police morgue of NRS medical college and hospital. The police morgue of NRS medical college is running since the year 1914 and near around 2500 post mortems are conducted in each year. (Medical Record Section, Nil Ratan Sarkar Medical College and Hospital). Dead bodies of all the age groups and both the sexes were considered as study population. Those having any co-existing condition suspected to interfere the cause of death and those died out of asphyxia were not included

in the study. From Medical Record Section of NRSMC, total no. of autopsy of head and neck injuries for the year 2014 was 467. As the data collection period was for 12 months and weekly 2 days (Tuesday and Thursday) were allotted for the principle investigator for data collection, by total enumeration, the sample size was 104. Socio-demographic parameters like as, age, gender, seasonal variation, type of impact, time of incidence, time interval between incidence and hospital admission besides macroscopic injuries, both internal and external over head and neck regions were studied. A pre-designed, pre-tested semi-structured questionnaire was used for data collection. History was taken from deceased's relatives regarding cause and mode of injuries and time lapsed. Police inquest report was corroborated with the findings. The available clinical records, investigation reports &/or the surgical notes were studied thoroughly to correlate the nature, site, extent of the injury or to get any other relevant information. External examination of the whole body was done and the surface injuries were noted with their fullest context. Color photographs were taken from different angles. To avoid the misinterpretation, any information regarding the pre-existing intracranial or cerebral pathology had been searched for and noted before autopsy conducted. Sheaf and Hopster technique³ was followed while removing the brain and observing the intra-cranial structures. The fixation of brain was done in 10% formalin solution, the brain being suspended upside down in a large bucket. Observation of brain was done both before and after fixation as per the cases. During the entire procedure, efforts were always there to establish the correlation between the findings of intracranial structures and external injuries besides possible mechanisms for causation of injuries to ascertain the probable cause of death. At every stages of dissection, the illustrative photographs were also taken. In the cases of neck injuries, especially in the cases of incised or stab injuries, through observation and meticulous dissection was done to find out the

tract to know the structures piercing or incising due to injury. In the cases of injury to the vital structures, like as trachea, esophagus, great vessels of neck, thorough observation was done as per proforma.

Results

Among the total study population of 104, 58 (55.76%) were from the jurisdiction of Entally P.S. and rest were from other different police stations. The majority of the victims belonged to age 21-40 years with mean \pm SD being 24 \pm 8.3years and 88 (84.61%) were male. In the current study, fatal head injury cases most commonly occurred (40.38%) during the monsoon (July to October) followed by winter (30.76%). More than 1/4th (25.96%) of the cases head and neck injury died within 6 hours of casualty and were 'brought dead' whereas 47.11% survived for more than 72 hours. Regarding the manner of death, 88.46% were accidental deaths. Regarding the cause and manner of injury, road traffic accidents were responsible for 67.30% of events. [Table1]

Regarding the patterns of injuries inflicted, among the cases with external injuries over face, 29.80% sustained only laceration and 12.50% had only abrasion whereas among scalp injuries, 65.38% of cases had extravasation of blood (only bruise) diffused into the scalp tissues. In the cases with injuries over front of the neck, only 5.76% had evidence of abrasion. Scalp hematoma was found over parieto-temporo-occipital region in 17.78% and only over occipital in 13.33% of cases. Out of 90 cases of scalp hematoma, both sides as right and left was found to be involved in 40.00% of cases followed by left side (35.56%). Fissural skull bone fracture was found in 21.15% of cases and depressed fractures were in 14.42% of cases. In the current study, predominantly there were involvement of temporal region (45.45%) and anterior cranial fossa (50.00%). Subdural hemorrhage was seen in 60.57% of cases whereas in epidural hemorrhage, temporal region involvement was the most common (64.28%). Among the cases with subdural hemorrhage,

65.30% had both cerebral hemisphere involvement and among those with intracerebral hemorrhage, 40.00% had frontal site hemorrhage. 21.15% had contusion type of brain injury though the spinal cord injury was in only 5.76% of cases. [Table 2]

Table 1: Distribution of victims according to the baseline characteristics

Variable(s)	Parameter(s)	Value(s)
Age	Mean \pm SD	24 \pm 8.3 years
Gender	Male	84.61%
Season	Monsoon	40.38%
Area of Jurisdiction	Entally P.S.	55.76%
Time of death since incident	\leq 6hours	52.89%
Manner of occurrence	Accidental	88.46%
Cause of injury	Road traffic accidents	67.30%

Table 2: Distribution of victims according to the pattern of injury

Variable(s)	Parameter(s)	Value(s)
Type of injuries	Bruise	65.38%
Scalp hematoma	Present	86.54%
Side of hematoma	Both sides	40.00%
Skull bone fracture	Present	35.57%
Site of fracture	Temporal	45.45%
Area of fracture	Anterior cranial fossa	50.00%
Site of hemorrhage	Subdural hemorrhage	60.57%
Area of hemorrhage	Temporal	64.28%
Site of subdural hemorrhage	Both cerebral hemispheres	65.30%
Site of intra cerebral hemorrhage	Frontal	40.00%

Discussion

In accordance to the current study with male to female ratio being 5.5:1, Tirpude et al.⁴ found it to be 4.4:1 and Patil et al. 4.6:1.⁵ No age was found immune for head and neck injury to occur. Dash and Roy⁶ had the similar type of findings as well as Pathak et al.⁷ and Sanjeeva et al.⁸ Road traffic incidents being the commonest cause of fatal head injury cases, the studies have been considered with similarities as done by Govekar et al.⁹ and Patil and Vaz⁵ also. Eqbal et al.¹⁰ from Aligarh got 40% RTA cases among total 100. More preponderance towards monsoon can be due to damaged road conditions and haziness of

windscreen of the vehicles interfering with visibility. Seasonal similarities have also been found to the studies by Biswas et al.,¹¹ Merchant et al.¹² etc. Regarding period of survival, in accordance to the current study, a study in England revealed that, 16% of road traffic deaths took place at the site, immediately or within few minutes. Of those who reached hospital, 44% succumbed within 24 hours. These were also supported by Rastogi et al.¹³ from Agra. In the present study, nearly 1/4th of cases were “brought dead” which could indicate necessity of more no. and more well equipped ‘trauma care centres’ even upto primary level of health care facility. Nearly 1/4th of cases in current study sustained bruises+lacerations which were also supported by Pathak et al.⁷ As found in the current study, left sided was more common than right, which may be due to the fact that, most of the human being right handed, can resist effectively traumatic injuries over right side. In accordance to the current study, Modi et al.¹⁴ found majority of the injuries to be accidental whereas Singh et al.¹⁵ found majority as homicidal. In the current study it has been found that, despite grave consequences later on, skull bones were intact in majority of the cases. Temporal region involvement was there in nearly 1/5th and this was closely supported by Menon and Nagesh.¹⁶ In line with the current study, where fissured fracture was more than 50%, Patil and Vaz⁵ and Rastogi et al.¹³ had similar findings, though Pathak et al.⁷ got 43.04% to be linear fracture over skull. According to Saukko and Knight,¹⁷ in majority of cases significance of a fractured skull is an indicator of a substantial insult to the head with a great threat towards vital contents rather the fracture itself being a danger to life. In contrast to the current study, Tirpude et al.⁴ and Chowdhury et al.¹⁸ had mostly temporal fracture whereas Sanjeeva et al.⁸ and Manon and Nagesh¹⁶ had similarity to the current study having majority of parietal. Though in present study, anterior cranial fossa involvement was commonest, Chowdhury et al.¹⁸ and Menon and Nagesh¹⁶ had mostly middle cranial fossa

involvement. Subdural hemorrhage played behind fatality in most of the cases in current study, which was in contrast to the Tirpude et al.,⁴ where EDH and Hussain et al. and Saukho and Knight,¹⁷ where SAH were majority.

Conclusion

Head always carries an accentuated target towards assault and brain along with meninges is more vulnerable towards even trivial injuries, along with often ill-defined manifestations and hence creates complexity. Road traffic injuries play the major role behind them and facial regions were affected in majority. Linear fissured fractures with temporal bone involvement were the commonest. Subdural hemorrhage caused a great no. of fatalities. Among the neck injuries, trachea and carotid artery were involved the most.

Acknowledgements

The authors sincerely acknowledge the assistance rendered by the mortuary attendants of the morgue of NRS Medical College and Hospital.

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