

Skull Fracture and Haemorrhagic Pattern in Cases of Fatal Blunt Trauma Head Injury Autopsied at Tertiary Healthcare Centre in Eastern Nepal

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ABSTRACT

Background: Head injury is regarded as a main health problem that is a common cause of morbidities and mortalities and makes great demand to control and prevent it. For this, policy makers need to see the pattern of head injury and this study is done to describe the pattern.

Methods: Hospital based, descriptive cross sectional study done on one year autopsy cases of fatal blunt trauma head injury which was 76 in which proportion of different types of head injuries, their causes and their distribution as per age, sex, and duration of survival were studied.

Results: Skull-vault fractures were present in 57 (75%) cases in which most common type of fracture was linear fracture constituting 29(49.12%). 50% of the cases were with skull-base fracture in which the most common was of anterior cranial fossa fracture(60.5%). 56.34% of the victims were with subarachnoid haemorrhage (SAH) followed by subdural haemorrhage (SDH) and extradural haemorrhage (EDH). 6.6% victims were without any intracranial haemorrhage. Road traffic accident alone accounted for 71% of total blunt trauma causations of this fatal head injury. 70% cases were in age group from 11 to 50years and 78.9% were male. 51.3% died at the spot.

Conclusions: The research findings have shown that among the fatal blunt trauma head injury cases, skull vault fracture was present in 75% and skull base fracture was present in 50%. The most common intracranial haemorrhage was subarachnoid haemorrhage (56.34%) followed by subdural and extradural haemorrhage.

Keywords : Blunt trauma, Head injuries, Morbidity, Mortality

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INTRODUCTION

Injury is defined as “harm to the body caused by an exchange with environmental energy that is beyond the body’s resilience.”¹ South-East Asia and western pacific regions is responsible for the highest number of death due to injury globally.² In the Asia Pacific Region, injuries caused around 2.7 million deaths in 2002, or over 7 thousand deaths daily, which was 52% of worldwide deaths due to injury. Low and middle income countries have higher rates of mortality produced by injuries than high-income countries.³

Injuries are estimated to cause 28% of worldwide deaths between 2004 and 2030 mostly which is due to increasing number of road traffic accidents.² The anatomy of various body parts plays a main role in determining the type of injuries. Head injury is regarded as a main health problem that is a common cause of morbidities and mortalities and makes great demand to control and prevent it.

As per study of morbidity and mortality for 1998-1999 in Nepal, injury constituted 9% to total mortality and was the 3rd leading cause, with road traffic accidents occupying the 8th position in the overall ranking. 58% of all injuries occurred in the 15-44 years age group with the male to female ratio of 3:1.⁴ A hospital-based study done among the 1848 patients of eastern Nepal with a history of trauma admitted within 1 year had shown that 38% were victim of Road Traffic Injury.⁵

Mortality associated with violence are sent for postmortem examinations in Nepal.⁶ Postmortem examination still remains the “benchmark” by which the clinician’s diagnosis is confirmed, revised or refuted. It is the most trustworthy and correct tool for inquiry of injuries.⁷ Early recognition of the injuries and providing an immediate treatment are necessary for saving many lives.⁸ If they are ignored, their conditions would ultimately have medico-legal implications.⁹ This study was done with an objective to determine the pattern and distribution of head injuries in blunt trauma cases of this region which were brought for Medico-legal postmortem examination in the morgue of a tertiary health care centre in eastern Nepal, B. P. Koirala Institute of Health Sciences (BPKIHS), Dharan.

MATERIALS AND METHODS

This was a hospital based, descriptive and cross-sectional study done on the autopsied cases with head injury which were conducted in the morgue of a tertiary health care centre in eastern Nepal, BPKIHS. Among 496 autopsies performed within one year period (13th April 2012 to 12th April 2013), 76 were victims of fatal blunt trauma head injury. Routine medico-legal autopsies of these cases were performed and the injuries were noted.

Inclusion and exclusion criteria: Autopsy cases of blunt trauma head injuries that died on the spot, on the way to the hospital and during treatment were included in this study and which were decomposed and/or where cause of trauma is not clear were excluded from this study.

Data Collection & Statistical Analysis: Data were collected in a detailed per form a developed for the postmortem analysis of blunt trauma injuries. Finally, the proportion of different types of head injuries, their causes and their distribution as per age, sex, and duration of survival were estimated. All collected data were compiled and entered into the Microsoft Excel programme. Statistical Package for Social Sciences (SPSS) version 11.0 was used for descriptive analysis to calculate frequency distribution. Observations were recorded, analyzed and discussed. Ethical clearance was taken from the Ethical Committee of BPKIHS.

RESULTS

Among 76 fatal blunt trauma head injury cases, 54 (71%) had Road Traffic Accident (RTA), 13 (17.1%) fall from height, 8 (10.5%) were victims of physical assault and 1 (1.3%) victim was due to collapse of roof/wall (Table I). Among RTA victims, 53.7% were pedestrians, 25.9% were on motorbikes, 11.1% were on four wheelers and 9.3% were on cycle. Majority of victims were males 60 (78.9%) and females accounted for only 16 (21.1%) with male to female ratio of approximately 3.7:1. Distribution of head injuries cases as per age group, time of incidence and duration of survival is mentioned in table 1, where most affected age group was 21-30 years (26.3%), most of the incidents occurred in between 3pm to 6pm (32.9%) and more than 50% of the cases died at the spot. As per the history given the relatives of the deceased, 34.2% of the total deceased had taken alcohol at the time of incidence.

Table 2 has shown the frequency and pattern of different types of head injury and injuries on other part of body associated with it. There were 50 (65.8%) individuals with some form of scalp injury namely contusion, laceration and avulsion in which laceration (70%) was the most common type of scalp injury. Skull vault fractures were

present in 57 (75%) cases in which most common type of fracture is linear fracture constituting 29(49.12%). It was found that the frontal region was the most common region in the vault of skull with 30 (52.63%) fractures. 50% of total cases were with skull base fracture in which the most common was of anterior cranial fossa fracture(60.5%). 28.6% of total anterior cranial fossa fractures were associated with periorbital ecchymosis. 40.8% of the total cases were with cerebral injury among which 93.4% cases were of coup injury and 30.3% cases were of contre coup injury. 17 (22.4%) victims were having brainstem laceration and 14 (18.4%) victims were with cerebellar laceration. 56.34% of the victims were with subarachnoid haemorrhage (SAH) which is very closely followed by extradural haemorrhage (EDH) and subdural haemorrhage (SDH). 5 (6.6%) victims were without any intracranial haemorrhage. The cause of death in more than half (51.3%) of the cases is injury to Central Nervous System(CNS) alone and in 48.7% cases is injury to CNS along with haemorrhagic shock.

DISCUSSION

Violence, morbidities and mortalities are increasing in Nepal due to increasing population, urbanization, industrialization, migration of the people and changing lifestyles. There is no systematic surveillance system to record these morbidities and mortalities scientifically so that they can be used for the purpose of prevention. In our study, we have recorded all one year head injury autopsy cases to get a pattern and distribution of fatal blunt trauma head injury cases.

In our study, male individuals were affected more. The most affected age group was 21-30 years that comprised 26.5% of the total cases followed by 31-40 years, 41-50 years and 11-20 years. Individuals with these age groups may have more energetic life and are at the top of their creativity with the tendency to take risk, alcohol intoxication, drug abuse etc. thereby endangering themselves to the risks of injuries. Similar outcome was also seen in study done by Singh O Gambhiretal.¹⁰ Oberoi SS¹¹ reported most of the lethal accidents (46%) occurred in the evening time followed by night time (22%) which is similar to our observation. 34.2% of total victims in our study were found to

be at intoxicated state at the time of the incident. Gururaj¹² has shown that the alcohol intake in evening and night time is responsible for the most of accidents in that time. In our study, there were 50 (65.7%) individuals with scalp injury namely contusion, laceration and avulsion which is similar with the finding in study done by Jain and Konkanady.¹³ Vasanta¹⁴ in his 220 head injury autopsied cases found skull fractures in 80.9% which is almost similar to our finding but fracture of the skull base in this study (15.9%) is even less than one-third of our study (50%).

Dikshit¹⁵ observed SAH(66.9%) as the commonest variety of intracranial haemorrhage followed by SDH (58.2%), intracerebral haemorrhage (22.5%), EDH (14.2%) and brainstem haemorrhage (10.8%). He also observed that laceration were the commonest injury (24.8%) followed by contusion (23.6%) which is similar to our observation. Lewin¹⁶ observed contrecoup lesion in 87.3% of total 55 cases contrecoup injury which is almost thrice to our study finding (30.3%). Out of head injury cases studied by Agrawal and Agrawal¹⁷ 31.2% were having head injury alone, 14% were associated with thoracic injuries, 6.2% with abdominal injuries and 1.5% with both thoracic and abdominal injuries, in contrast, we found 41.17% associated thoracic injury and 39.21% associated abdominal injury.

CONCLUSION

This study has shown 75% of total cases with skull vault fracture in which linear type of fracture is the commonest and 50% of total cases with skull base fracture in which anterior cranial fossa involvement is the most. Periorbital ecchymosis is a good indicator for further internal skull investigation as it is present in 28.6% of the cases with anterior cranial fossa fracture. Subarachnoid haemorrhage is the commonest intra-cranial hemorrhage in the fatal blunt trauma head injury cases. All these fatal blunt trauma head injury findings are more common in economic productive age groups and male individuals. More than 50% head injury cases had died at the spot of the incident which demands us to focus on preventive measures and basic life support training to normal public.

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REFERENCES

1. Brunnicardi FC, Andersen D, Billiar T, Dunn D, Hunter J, Pollock RE. Schwartz's principles of surgery. McGraw-Hill Professional; 2004.
2. Norton R, Hyder AA, Bishai D, Peden M. Unintentional Injuries. In: Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, Jha P, Mills A, Musgrove P, eds. Disease Control Priorities in Developing Countries : Washington DC; Oxford University Press: 2006. p. 737-53.
3. Bhandari GP, Dhimal M, Ghimire U. Epidemiological Study in Injury and Violence in Nepal. Nepal Health Research Council Study; 2009.
4. Nepal Net: an electronic networking for sustainable development in Nepal. Available from: URL: www.panasia.org.sg/nepalnet/facts_fig2.htm.
5. Bajracharya A, Agrawal A, Yam BR, Agrawal CS, Lewis O. Spectrum of surgical trauma and associated head injuries at a university hospital in eastern Nepal. Journal of neurosciences in rural practice. 2010;1(1):2.
6. Sharma G, Shrestha PK, Wasti H, Kadel T, Ghimire P, Dhungana S. A review of violent and traumatic deaths in Kathmandu, Nepal. International journal of injury control and safety promotion. 2006 Sep 1;13 (3):197-9.
7. Jansen JO, Yule SR, Loudon MA. Investigation of blunt abdominal trauma. BMJ. 2008 ;336 :938-42.
8. Jhanjee A. A postmortem study of abdominal and pelvic trauma in central delhi. Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology. 2000;1(2).
9. AW SI. An epidemiological study of abdominal and pelvic injury trauma in post-mortem cases at Hospital Kuala Lumpur between the year of 2002-2003. Jurnal Sains Kesihatan Malaysia. 2008;6(2):65-73.
10. Joshi SK. A study of injuries and violence related articles in Nepal. J Nepal Med. Assoc. 2009;48(3):209-16.
11. Oberoi SS, Aggarwal KK, Walia DS, Kumar R, Sandhu H. Profile of Fatal Two Wheeler Accidental Cases. Journal of Punjab Academy of Forensic Medicine & Toxicology. 2010;10(2):72-5.
12. Gururaj G. The effect of alcohol on incidence, pattern, severity and outcome from traumatic brain injury. Journal of the Indian Medical Association. 2004 Mar;102(3):157-60.
13. Jain SP, Kankanady VD. A study of 1500 cases of head injury in Delhi. Journal of the Indian Medical Association. 1969;52(5):204.
14. Vasantha VC. A study of head injuries in Guntur. Journal of the Indian Medical Association. 1969;53(6):291-3.
15. Chandra J, Dogra TD, Dikshit PC. Pattern of cranio-intracranial injuries in fatal vehicular accidents in Delhi, 1966-76. Medicine, Science and the Law. 1979;19(3):186-94.
16. Lewin W. Factors in the mortality of closed head injuries. British medical journal. 1953;1(4822):1239.
17. Agrawal S, Agrawal SN. Fatal road accidents, an analysis of sixty four autopsied body. Journal of Indian Academy of Forensic Sciences. 1967;6:26-32.