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Head injury patterns and outcome at tertiary care center in central India: A prospective observational study

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Abstract

Background: Head injury is significant public health problem and it is one of leading causes of death worldwide. Our aim of this study is to study various patterns, epidemiological aspects, radiological findings and treatment modalities of head injury.

Material and Method: A total of 250 cases of head injuries satisfying inclusion criteria were included in the study using convenience non-random sampling method reporting period from October 2020 to November 2022 attending Casualty of Trauma care center of Tertiary Care hospital of Central India. Patients were observed for their outcome and appropriate statistical procedure was performed.

Results: Majority of patients reach hospitals by around 1-3 hours (43.2%) followed by <1 hour (28%). Majority of patients had road traffic accident (62%) followed by H/O fall. (25.2%), assault (8.4%) and others (4.4%). Majority of patients had mild GCS score (62%) followed by moderate (21.2%) and severe among 42 (16.8%) patients. Majority of patients managed conservatively (81.2%) followed by operative procedures. (18.8%). Majority of patients survived with minimal or no disability 176(70.4%) while some patients survived with Moderate to severe disability are 38(15.2%) and 31 patients (12.4%) lost their life after head injury.

Conclusion: The study showed that most head injury victims, brought to a tertiary care hospital, were due to road traffic accidents. This emphasizes on a need to develop preventive measures like awareness about traffic rules, the use of seat belts and helmets, an improved construction and the maintenance of the roads, better traffic monitoring, the prevention of drunken driving amongst the automobile drivers, and increased road traffic sense in the road.

Keywords: Accident, head injury, fracture, trauma

Introduction

Head injury is defined by National Advisory Neurological Diseases and Stroke Council as -a morbid state, resulting from gross or subtle structural changes in scalp, skull, and/ or the contents of the skull, produced by mechanical forces ^[1]. Head injury is a significant public health problem worldwide and is predicted to surpass many diseases as a major cause of death by 2030 ^[2]. Road traffic injuries are one of the leading cause of deaths globally, and are estimated to rank sixth by the year 2020 (Ischemic heart diseases being the first leading cause of death). India has the rather unenviable distinction of having the highest rate of head injury in the world. In India, more than 100,000 lives are lost every year with over 1 million suffering from serious head injuries. Every day, according to a survey ^[3]. At 18.9 deaths per hundred thousand populations, the estimated mortality from road traffic accidents (RTA) is also among the highest in the world in our country ^[4]. For every death on the road, there is 20 times the number of patients who survive with significant head injuries. As Per data released by Ministry of Road transport and highways, Total number of road traffic accidents in India in year 2020 are 3,66,138 which caused death of around 1,31,714 persons. In year 2021, Total no of Road traffic accidents in India increased to 4, 22,659 which took life of 1, 55,622 Person ^[5].

Head injuries are basically classified into two types depending on the involvement of dura mater. Closed head injury where the dura mater is intact and open head injury where dura mater is torn. However, based on gross anatomical involvement of structures head injuries are

classified into scalp injuries, facial injuries, skull injuries, injury to meninges and injury to the brain [6]. About 75% of brain injuries are mild to moderate in nature, subjects with head injury may have variable presentations such as from normal to confusion and deep coma, along with abnormal pupillary reactivity, CSF leak, cranial nerve VI & VII palsies, fits and anosmia. Thus traumatic brain injuries can have physical and behavioral impact. Social crisis, joblessness and/or disability may be the consequence such traumatic brain injuries [7].

Severe head injury, with or without peripheral trauma, is the commonest cause of death and/or disability up to the age of 45 years in developed countries. This necessitated an in-depth analysis on the pattern of head injury in road traffic accidents and other factors influencing the Pattern of head injuries. Head injury is a major public health problem and has already attained epidemic proportions in India. As a result, craniocerebral trauma places a huge financial and psychological burden upon the society. In India. The current statistics are necessary to notify the policy makers for about the rising burden of head injury and grant a physically powerful encouragement means, preventive occasions, prerequisite for unmet capability requirements, and enhanced provision from restricted health care assets.

Our aim of this study is to study various patterns, epidemiological aspects, radiological findings and treatment modalities of head injury.

Material and Method

The present prospective observational study carried out at Tertiary hospital to study head injury patterns and outcome. This study was conducted during the period from October 2020 to November 2022. Patients attending Casualty of Trauma care center of Tertiary Care hospital of Central India. Patients admitted to Department of Trauma care Centre in a tertiary care center in central India with Isolated head injury were included in the study. A total of 250 cases satisfying inclusion criteria were included in the study using convenience non-random sampling method. Inclusion criteria were; isolated head injury patients admitted in department of Trauma care centre during study period and subjects with age group of 13 years or more. Exclusion criteria set were patients of polytrauma, Outside Managed patients, Patients reaching trauma care centre after 1st 24 hours of accident, unknown patients, Nontraumatic/pathological causes of head injury like syncopal fall/hypertensive bleed/patients on antiplatelet drugs and patients not willing for informed consent. The study was conducted after obtaining clearance from the Ethical Committee of the institute and permission from the appropriate authority. The selected subjects were visited and the questionnaire was administered after a written informed consent was obtained from the participants. All patients admitted with head injury and polytrauma, a careful history collected from the patient and/or attendants to reveal the mechanism of injury and the severity of trauma. The patients were then assessed clinically to evaluate their general condition and the local injury. Patients were investigated with NCCT head being the cornerstone of Investigation. Type Intracranial Hemorrhage with Type, site and number of fractures and other injuries noted. Patient were managed as per advice of Consulting Neurosurgeon in department of Trauma care centre in Tertiary hospital of central India. Patients were observed for their outcome and appropriate statistical procedure was performed.

Results

Majority of patients were in age group 13-30 years (36.8%)

followed by 31-40 years (22.4%). Majority of patients were male (87.2%) and females were 12.8%. Majority of patients reach hospitals by around 1-3 hours (43.2%) followed by <1 hour (28%). Majority of patients had road traffic accident (62%) followed by H/O fall. (25.2%), assault (8.4%) and others (4.4%). majority of patients don't use helmets while driving (73.98%). Majority of patients presented with loss of consciousness (62.8%) followed by Nausea/ Vomiting (21.2%), Convulsions (10.8%) and headache (10.8%). It was observed that majority of patients had mild GCS score (62%) followed by moderate (21.2%) and severe among 42 (16.8%) patients. It was observed that majority of patients had depressed skull fracture (37.2%) followed by Comminuted fracture (26%) and linear among 35 (14%) patients [Table 1]. No skull fracture was observed in 57 (22.8%) patients. In respect to location of skull fracture, majority of patients had skull fracture at more than one location (34.71) followed by temporal region (27.97) followed by Parietal region (16.06%), followed by frontal region (6.73%) and least at Posterior cranial fossa (1.55%). It was observed that majority of patients had subdural hemorrhage (82.8%) followed by sub-arachnoid hemorrhage (82%), contusion (48.4%), cerebral oedema (33.2%) and least IVH. (5.2%) [Table 2].

It was observed that majority of patients managed conservatively (81.2%) followed by operative procedures. (18.8%). In respect to operative procedures, majority of patients managed by craniotomy (63.41%) followed by Burr hole. (44.59%). According to outcome of subjects, majority of patients survived with minimal or no disability 176 (70.4%) while some patients survived with Moderate to severe disability are 38 (15.2%) and 31 patients (12.4%) lost their life after head injury.

Discussion

The present prospective observational study was conducted to study head injury patterns and outcome at tertiary care center in central India. The study was conducted in tertiary care Hospital from October 2020 to September 2022. A total sample size of 250 patients with head injury > 13 years was included in the study. Patients of polytrauma, outside operated patients, patients reaching trauma care center after 1st 24 hours of accident, Unknown patients, nontraumatic/pathological causes of head injury like syncopal fall/hypertensive bleed/patients on antiplatelet drugs and patients not consenting to participate in study were excluded. The study was conducted after taking ethical clearance from the institute and informed consent from the patients. The data was collected from patients regarding demographic profile, clinical profile and investigations were done. SAPS score and SIRS calculated and analyzed by statistical software.

Study conducted by Vikram Singh *et al.* [9]. It was observed that Majority of Patients with Traumatic brain injury, belong to 21-39 years of age (53.8%). One additional finding was observed in this study that patients of age group 40-59 years of age have unfavorable early and late outcome. Mathieu Motah *et al.* [10]. Conducted a study in Cameroon which observed that patients with age group 18-36 years suffer most of (37.4%) Traumatic brain injuries. Tirpude *et al.* [7] also pointed out that commonest age group was 21-30 years of age (39%). Similar results were seen in study conducted by M Kirankumar *et al.* [11] at Andhra Pradesh, India. This age group (21-40 years) is the most vulnerable group involved in head injury cases. The obvious reason being them form main working group. This age group is most active phase of life physically and socially. People in this age group are constantly mobile for work, education or

recreational activities. Hence prone to road traffic accident, falls, assaults which are one of major causes of head injuries. In study conducted by Peter Schwenkreis *et al.* [12] it was observed that Majority of patients suffering traumatic brain injury are males (59.2%). Similar results were found in study conducted by Jessica Eaton *et al.* [13] A study conducted in Tertiary Care hospital Of Dhaka, Bangladesh by Sukriti Das *et al.*, [14] it was observed that out of 14,552 cases, 72% (10,477) Were males and 28% (4075) were females. A high incidence of head injury among males can be explained by the fact that males are the working class, they lead a more active life and keep themselves outdoor for most of the time. In accordance to road traffic accident and most of the vehicles in India are driven by males. On the contrary, females keep themselves indoors doing household activities.

Rohadi Muhammad Rosyidi *et al.* [15] in a study on pattern of head injury cases observed that road traffic accident was the commonest cause of head injury seen in 83.25% cases. This is followed by fall from height 16.75% cases. In this study they also studied causes of Road traffic accidents and it was found that Motorcycle was responsible for majority of cases (71%). Study conducted by Ram Avatar Malav *et al.* [16] at New Delhi, India It was observed that 60% Patients with head injury have RTA as cause. Falls and assaults were responsible for 25% and 10% respectively. Similar results were found out in study conducted by M Kirankumar *et al.* [11]. The distribution of patients according to use of helmets showed that majority of patients don't use helmets (73.98%). In a study conducted by Asrar Ali *et al.* [17] at Tertiary care centre in Pakistan also observed that, Majority of patients with head injury don't use helmets.

In study conducted by Ram Avatar Malav *et al.* it was found that 45% patients had mild severity and 35% and 20% patients had observed with moderate and severe head injury. In a study Anubhav Goel *et al.* [16] 59.6% patients had mild head injury while 22.3% and 18% patients had moderate and severe head injury respectively. Total 17% deaths were noted in present study. Jha S *et al.* [18] studied pattern of fatal head injury in a teaching hospital observed comminuted fractures were found in a maximum number of cases (45.16%), followed by depressed and linear fractures (38%) in almost the same numbers of cases. Avinash H. Waghmode *et al.* [19] in a study on pattern of head injury cases admitted at tertiary care center observed that linear fracture was observed in 43 (41.75%) cases followed by depressed fracture in 14 (13.59%) and comminuted fracture in 09 (8.74%) cases.

Avinash H. Waghmode *et al.* [19] in a study on pattern of head injury cases admitted at tertiary care center observed temporal bone was involved in skull fracture accounting for 43 (41.75%) cases followed by parietal bone 23 (22.33%) cases, frontal bone 10 (9.71%) and occipital bone 7 (6.80%) cases. Thus temporal bone was the most common bone involved in fracture of skull in the present study. Regarding the base of skull, anterior cranial fossa is involved in 11 (10.68%) cases followed by middle cranial fossa in 10 (9.71%) cases and posterior cranial fossa in 09 (8.73%) cases. Lalit Kumar *et al.* [20] in a study observed individually temporal bone was involved in skull fracture i.e. 22 cases (26.51%) followed by frontal bone which was 21 cases (25.30%). 24 cases were being involved of more than one bone (28.92%).

Vikram Singh *et al.* [9] in a study on pattern of head injury cases admitted at tertiary care center observed that Hemorrhagic Contusion is the most common type of haemorrhage detected in 59% cases closely followed by Subdural hemorrhage in 50%

cases, subarachnoid haemorrhage (SAH) in 24% cases, extradural haemorrhage (EDH) in 18% cases. In study conducted by Sonukumar plash *et al.* [21] EDH (27%), SDH (26%) and SAH (18%) were leading type of Hemorrhages. In Study conducted by Mathieu Motah at [10] Cameroon it was observed that 39.7% patients had Subdural hemorrhage followed by Extradural hemorrhage in 31.1% patients. Subarachnoid hemorrhage and Hemorrhagic Contusion in 10.9% and 18.3% patients.

In accordance with our findings. In study conducted on 353 patients by Ibrahim Alnaami *et al.* [22] at Saudi Arabia, it was observed that 78% Patients with head injury were managed conservatively and 22% patients were managed surgically. Surgical interventions needed for EDH in 35 cases, SAH in 21 cases, SDH in 16 cases, Contusion in 2 cases, fracture in 4 cases and Intraventricular hemorrhage in 1 case. Sonu Kumar Plash *et al.* [21] in a study on various modalities of management and outcome in patients of head injury at a tertiary hospital observed 99 patients (82%) were managed conservatively with monitoring in the surgical intensive care unit without the requirement of operative intervention. Operative interventions were required only in 21 (18%) patients which included Craniotomy (7 patients) and Burr Hole (14 patients), here also most Common indication for Surgical interventions were EDH, SAH and SDH. Another study by Patel NY *et al.* [23] 11 of 462 patients with head injuries with CT-imaged intracranial hematomas who were treated non-operatively found that only approximately 10% progressed clinically and eventually required surgery. A study conducted by Sukriti Das *et al.* [14] at Dhaka, Bangladesh also observed similar results.

In Study Conducted by Ibrahim Alnaami *et al.* [24] it was observed that out of 353 patients with head injury, Majority of patients (64.3%) had good recovery, Moderate to severe disability was observed in 25.8% Patients, Persistent vegetative state in 7.4% patients and death in 2.5% patients. In Study conducted by Amos O. Adeleye *et al.* [25]. They studied outcome of Patients based on Severity of head injury. They studied around 833 patients. Out of them, 415 patients suffered Mild head injury, and in Patients with mild head injury 94.9% patients had good outcome with death in 3.9% patients. 230 Patients suffered Moderate head injury, of them 69.1% patients had good outcome, 10% were severely disabled and death reported in 20.9% patients. 188 patients suffered severe head injury of them only 20.7% patients had good outcome and 65.4% patients died.

Table 1: Distribution of patients according to type of skull fracture

Type of skull fracture	No of patients	Percentage
Linear (Fissured)	35	14.00
Depressed	93	37.20
Comminuted	65	26.00
No fracture	57	22.80
Total	250	100

Table 2: Distribution of patients according to type of head injury

Type of brain injury	No of Patients	Percentage
SDH	207	82.80
SAH	205	82.00
EDH	45	18.00
ICH	26	10.40
IVH	13	05.20
Contusion	121	48.40
Diffuse axonal injury	26	10.4

Conclusion

Trauma is leading cause of head injury. Necessary preventive

measures and vigorous training of all medico and paramedical staff for early management of head injury can reduce mortality and morbidity due to head injury. The study showed that most head injury victims, brought to a tertiary care hospital, were due to road traffic accidents. This emphasizes on a need to develop preventive measures like awareness about traffic rules, the use of seat belts and helmets, an improved construction and the maintenance of the roads, better traffic monitoring, the prevention of drunken driving amongst the automobile drivers, and increased road traffic sense in the road users. It also warrants the urgency to establish good pre-hospital care and provision of efficient and prompt trauma services at Road side to prevent mortality aroused from RTA. First hour after head injury i.e. Golden hour is very important in patients with head injury. Patient should receive prompt neurosurgical care in 1st hour to avoid secondary brain injury. Interventions can be simple like applying tourniquet to stop bleeding or complex like evacuation of intracranial hematoma.

Helmets can help to cut the severity of impact of collision between skull and road. Therefore laws regarding helmet use while driving should be strengthened and helmet use should be encouraged. Type, site and number of skull fractures contribute to severity of head injury and fate of the patient. Intracranial Hemorrhages also decides the fate. Extradural hematoma has better prognosis. Majority of Patients can be Managed Conservatively. Operative Management was needed for interventions like SDH, SAH and EDH. Patient needing operative management should Receive Prompt neurosurgical Care to reduce Complications associated with head injury. Head injury with polytrauma affects outcome badly and needs critical multispeciality management. India is developing country and contribution of young population in nation building is very important. Loss of young population affects growth of country and health of family hence preventive and safety measures and good training of staff involved in trauma care can save many lives.

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References

1. Tedeschi CG. Head and Spine. In: Tedeschi CG, Eckert WG, Tedeschi LG, editors. Forensic Medicine – A study in trauma and environmental hazards. Philadelphia: WB Saunders; 1977. p. 29-75.
2. Vij K. Regional Injuries. In: Textbook of Forensic Medicine and Toxicology: Principles and practice. 5 th ed. New Delhi: Reed Elsevier; 2011. p. 270.
3. Ministry of Road Transport. Road Transport Year Book (2016-2017). New Delhi, India, 2017
4. Regional strategy for road safety in South East Asia. WHO Regional Office for South East Asia. New Delhi, India, 2015.
5. Ministry of Road Transport. Road Transport Year Book (2020-2021). New Delhi, India. 2021.
6. Rao NG. Regional injuries. In: Text book of Forensic medicine and Toxicology. 2nd ed. New Delhi: Jaypee brothers medical publishers (P) Ltd; 2010. p. 234.
7. Tirpude BH, Naik RS, Anjankar AJ, Khajuria BK. A study of the pattern of cranio-cerebral injuries in road traffic accidents. J Indian Acad Forensic Med. 1998;20(1):9-12.
8. Munro D. Cranio-cerebral injuries. In: Gordon I, Shapiro HA, Berson SD. editors. Forensic Medicine A Guide to Principles. 3rd ed. Oxford University Press: Churchill Livingstone, 1998, 252.
9. Singh V, Nath A, Beniwal M, Singh P, Dahiya R. Evaluating the predictive factors affecting outcome in patients with severe traumatic brain injury: a prospective observational study Int Surg J. 2021;8:1762-6.
10. Motah M, Ndoumbe A, Massi DG, Bekolo FF, Inemb GB, Moumi M, *et al*. Traumatic intracranial haemorrhage in Cameroon: clinical features, treatment options and outcome. Interdisciplinary Neurosurgery. 2021 Dec 1;26:101346.
11. Kirankumar MR, Satri V, Satyanarayana V, Ramesh Chandra VV, Madhusudan M, Sowjanya J. Demographic profile, clinical features, imaging and outcomes in patients with traumatic brain injury presenting to emergency room. J Clin Sci Res. 2019;8:132-6.
12. Schwenkreis P, Gonschorek A, Berg F, *et al*. Prospective observational cohort study on epidemiology, treatment and outcome of patients with traumatic brain injury (TBI) in German BG hospitals. BMJ Open. 2021;11:e045771
13. Eaton J, Hanif AB, Grudziak J, Charles A. Epidemiology, Management, and Functional Outcomes of Traumatic Brain Injury in Sub-Saharan Africa. World Neurosurg. 2017 Dec;108:650-655.
14. Das SK, Rahman A, Chisti MJ, Ahmed S, Malek MA, Salam MA, *et al*. Changing patient population in D haka H ospital and M atlab H ospital of icddr, b. Tropical Medicine & International Health. 2014 Feb;19(2):240-3.
15. Rosyidi RM, Priyanto B, Laraswati NK, Islam AA, Hatta M, Bukhari A, *et al*W. Characteristics and clinical outcome of traumatic brain injury in Lombok, Indonesia. Interdisciplinary Neurosurgery. 2019 Dec 1;18:100470.
16. Adeloje A, Al-Kuoka N, Sembatya-Lule GC. Pattern of acute head injuries in Kuwait. East Afri Med Jr. 1996; 73: 235-238.
17. Avtar Malav R, Shankar Shukla U, Nagar M. Epidemiology and clinical characteristics of traumatic head injuries in central part of India, 2018- 2019. Indian J Neurosci 2019;5(3):117-121
18. Jha S, Yadav BN, Agrawal A, Thakur D, Karna A, Subedi N, Gurung S. The pattern of fatal head injury in a teaching hospital in Eastern Nepal. Journal of clinical and diagnostic research. 2011 Jun;5(3):592-96.
19. Waghmode AH, Meshram SK. Pattern of head injury cases admitted at tertiary care centre in central India. Indian Journal of Forensic and Community Medicine. 2017 Oct;4(4):221-4.
20. Kumar L, Agarwal S, Singh T, Garg R. Patterns of head injury at tertiary care hospital. International Journal of Scientific Study. 2014;1(5):5-8.
21. Sonu Kumar Plash, Prakash Gurav. Study of various modalities of management and outcome in patients of head injury at a tertiary hospital. MedPulse International Journal of Surgery. February 2022; 21(2): 27-30.
22. Alnaami I, Alshehri S, Alghamdi S, Ogran M, Qasem A, Medawi A, *et al*. Patterns, types, and outcomes of head injury in Aseer Region, Kingdom of Saudi Arabia.

- Neuroscience Journal. 2019;2 (1):13-17.
23. Patel NY, Hoyt DB, Nakaji P, *et al.* Traumatic brain injury: patterns of failure of non-operative management. J Trauma. 2000 Mar;48:367-74.
 24. Alnaami I, Alshehri S, Alghamdi S, Ogran M, Qasem A, Medawi A, *et al.* Patterns, types, and outcomes of head injury in Aseer Region, Kingdom of Saudi Arabia. Neuroscience Journal. 2019;2(1):13-17.
 25. Adeleye AO and Ogun MI. Clinical Epidemiology of Head Injury from Road-Traffic Trauma in a Developing Country in the Current Era. Front. Neurol. 2017;8:695.

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