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Original Research

Clinico-Epidemiological Profile of Traumatic Brain Injury in Tertiary Care Center in Rural India

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ABSTRACT

Background: Traumatic brain injury (TBI) corresponds to non-degenerative, non-congenital trauma to the brain caused by an outside mechanical impact.This study wasplanned to assess the clinico-epidemiological pattern of Traumatic brain injuries in tertiary centre in rural India.

Materials &Methods:200 patients with head injury admitted under Department of General Surgery, NMCH, Sasaram were enrolled. After admission to the hospital, a detailed history was taken regardingthe presenting complaints particularly the epidemiological factors, mode of injury, clinical findings, radiological findings, and type of intervention done.All patient suspected to have traumatic brain injuries; CT scan of brain was done.

Results: Out of 200 patients, 145 were males and 55 were females.Mode of injury of most of patients (60%) was RTA followed by Fall (25.50%).Most of the patients (52.50) had GCS ≥ 13. 15.50% of patients had GCS ≤ 8.Loss of consciousness was most frequent (74.5%) clinical characteristics followed by vomiting (60.5%). Headache was reported by more than 50% of patients.All the patients with GCS ≤ 8 had loss of consciousness. Incidence of other clinical symptoms was also greater in patients with severe GCS.Severe disability, vegetative state and death were more prevalent in elderly patients.

Conclusion: Patients with TBI are diverse and do not exhibit the risk variables recommended by guidelines when it comes to neurocranial injury. Given this and the ongoing technological advancements in radiology that frequently lead to improved pathology identification and characterization, it is essential to regularly update clinical guidelines.

Keywords: CT scan,clinical examination, traumatic brain injury.

Introduction

Traumatic brain injury (TBI) corresponds to non-degenerative, non-congenital trauma to the brain caused by an outside mechanical impact.[1] It may result in a reduced orchanged state of consciousness as well as an ongoing or short-term dysfunction of cognitive, physical, as well as psychosocial abilities.[2] Traumatic brain injury (TBI) is typically defined as a change in brain function or other indication of brain pathology brought on by an outside source. "The World Health Organization (WHO)" estimates that almost 90 % of deaths are trauma related in low-and middle-income countries.[3] The Centers for Disease Control and Prevention (CDC) state that a penetrating head injury that impairs brain function or a bump, blow, or jolt to the head are the causes of traumatic brain injuries (TBIs). There are two types of traumatic impact injuries: closed (nonpenetrating) and open (penetrating).[4]

There are various factors that determine the pattern and severity of Traumatic brain injuries such as age, socioeconomic factors, geography, level of awareness among the citizens, the implementation of strict traffic laws.[5]There are various methods of classifying the severity of Traumatic brain injuries, to highlight the amount of brain parenchymal disruption. These are the Glasgow Coma Scale(GCS), the Abbreviated Injury Severity Score (AIS), and so on. The aim of categorisation is to predict the outcome.[6]This study wasplanned to assess the clinico-epidemiological pattern of Traumatic brain injuries in tertiary centre in rural India.

Materials & Methods

The study comprised of 200 patients with head

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injury admitted under Department of General Surgery, NMCH, Sasaram.Participant Information Sheet (PIS) was provided and explained to patients in their local language. Thereafter, consent was approved by taking their signature or thumb impression on the informed consent form.

Data such as name, age, gender etc. was recorded. •After admission to the hospital, a detailed history was taken regardingthe presenting complaints particularly the epidemiological factors, mode of injury, clinical findings, radiological findings, and type of intervention done.In addition to the history of trauma, headache, seizures, loss of consciousness, amnesia, vomiting, dizziness, ear and nose bleedwere recorded.Age, gender, race, mechanism of injury, protective device use, present GlasgowComa Score (GCS) and systolic blood pressure on admission were recorded and patient is monitored gradually with GCS followed by assessment of GCS after months.All patient suspected to have traumatic brain injuries; CT scan of brain was done.Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

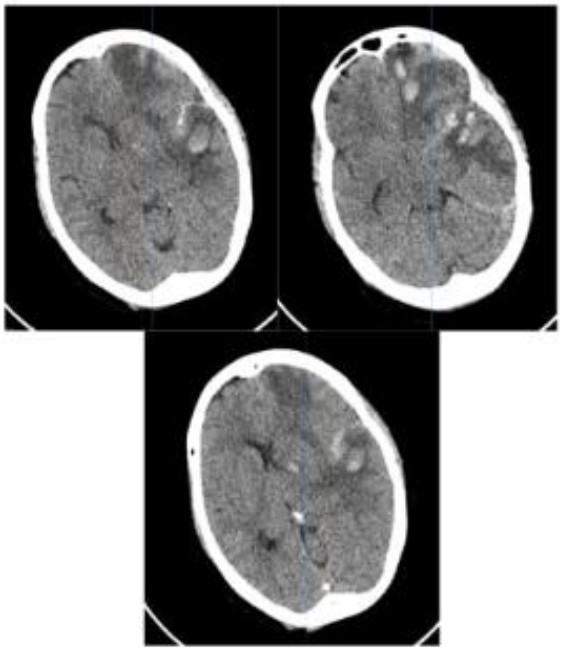

Figure 1: NCCT head following RTA shows SAH (along left Sylvia fissure), multiple contusions with peri-lesion edema in left frontal and temporal region causing mass effect in form of compression of ipsilateral lateral ventricle and contralateral midline shift of 7.8mm.

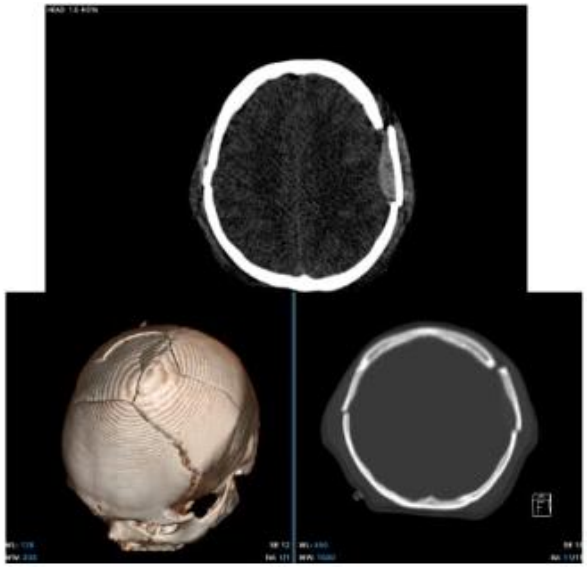

Figure 2: NCCT head of a 26 years old male following RTA shows EDH in left parietal region with fracture of left temporal- parietal bone extending to right parietal bone and associated subgaleal hematoma.

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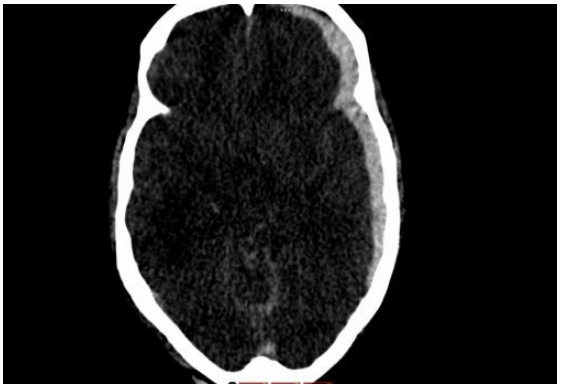

Figure 3: NCCT Head of a patient done following RTA showing SDH in left fronto-parieto-temporal region.

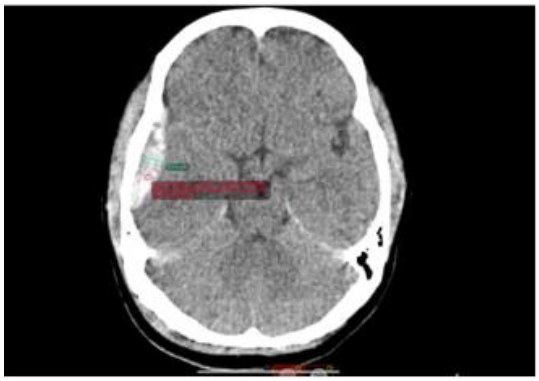

Figure 4: NCCT head of a patient done following RTA showing biconcave area of hemmorhagic attenuation (mean HU: 70) in right temporal region representing EDH.

Table: IDistribution of patients

Total- 200		
Gender	**Male**	**Female**
Number	145	55

Table I shows that out of 200 patients, 145 were males and 55 were females.

Table: II Distribution of Patients of Traumatic Brain Injury with respect to Mode of Injury

Mode of Injury	Number of Patients	% of Patients (n=200)
RTA	120	60.00
Fall	51	25.50
Assault	25	12.50
Animal attack	4	2.00

Mode of injury of most of patients (60%) was RTA followed by Fall (25.50%).

Table: III Distribution of Patients of Traumatic Brain Injury with respect to GCS Score

GCS Score	Number of Patients	% of Patients (n=200)
Mild (≥ 13)	105	52.50
Moderate (9-12)	64	32.00
Severe (≤ 8)	31	15.50

Most of the patients (52.50) had GCS ≥ 13. 15.50% of patients had GCS ≤ 8.

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Table: IV Distribution of Patients of Traumatic Brain Injury with respect to Clinical Characteristics

	Number of Patients	% of Patients (n=200)
Loss of Consciousness	149	74.50
Vomiting	121	60.50
Focal Neurological Deficit	17	8.50
Seizures	25	12.50
Headache	105	52.50
Ear or Nose Bleed	72	36.00

Loss of consciousness was most frequent (74.5%) clinical characteristics followed by vomiting (60.5%). Headache was reported by more than 50% of patients.

Table :V Correlation between Clinical Characteristics and GCS Score

	Mild (n=105)	Moderate (n = 64)	Severe (n = 31)
Loss of Consciousness	57 (54.29)	61 (95.31)	31 (100)
Vomiting	40 (38.1)	53 (82.81)	28 (90.32)
Focal Neurological Deficit	0 (0.00)	2 (3.13)	15 (48.39)
Seizures	1 (0.95)	6 (9.38)	18 (58.06)
Headache	19 (18.1)	57 (89.06)	29 (93.55)
Ear or Nose Bleed	33 (31.43)	26 (40.63)	13 (41.94)

All the patients with GCS ≤ 8 had loss of consciousness. Incidence of other clinical symptoms was also greater in patients with severe GCS.

Table: VI Correlation of Age with Outcome on 3 Months of Follow-Up

Outcome	Age Group, n (%)		
	20-30 (n=43)	31-40 (n=82)	41-50 (n=75)
Good Recovery	22 (51.16)	38 (46.34)	27 (36)
Moderate Disability	10 (23.26)	20 (24.39)	19 (25.33)
Severe Disability	6 (13.95)	13 (15.85)	14 (18.67)
Vegetative State	5 (11.63)	9 (10.98)	12 (16)
Death	0 (0)	2 (2.44)	3 (4)
P-Value (Chi-Square Test)	0.78		

Severe disability, vegetative state and death were more prevalent in elderly patients.

Discussion

In this prospective observational study, we have evaluated the prevalence and the relative correlation between clinical, epidemiological, and radiological parameters.Traumatic brain injuries may also be divided as mild/ moderate/ severe Traumatic brain injuries or as primary/secondary.[7] Primary brain injury includes cortical disruption, axonal injury, vascular injury, haemorrhage and so and occur at the time of impact. Secondary injury results from various aetiologies, such as inflammation, hypoxia, oedema and ischemia.[8]This study was planned to assess the clinico-epidemiological pattern of Traumatic brain injuries in tertiary centre in rural India.

We found that out of 200 patients, 145 were males and 55 were females.Mode of injury of most of patients (60%) was RTA followed by Fall (25.50%).B Raghavendra et al[9] in 2019conducted a study on clinico-epidemiological profile and determinants of outcome of traumatic brain injury patients. Among 5092 patients studied, the majority were aged 15 45years (68%) and males (82.6%). Road traffic accidents (74%) were the leading cause and 63% of had mild, 16% moderate and 21% severe head injury. 16% of traumatic brain injury were associated with other injuries, majority of which include chest and abdomen injuries and lower limb long bone fractures. Skull bone fractures, acute subdural, intra-cerebral and extradural haemorrhages were the most common CT findings. 13.2% of the patients were managed surgically. The overall mortality in his series was 15% and the factors associated with increased mortality are elderly age, poor presenting GCS, associated thoraco-abdominal injuries, lower limb and pelvic fracture, multiple bleeds, diffuse axonal injury, diffuse subarachnoid haemorrhage, bleed involving more than one cranial fossa, occipital bleed and counter-coup injuries. Road traffic accidents are the leading cause

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of traumatic brain injury in Karnataka affecting mainly young adult males.

Most of the patients (52.50) had GCS ≥ 13. 15.50% of patients had GCS ≤ 8.Loss of consciousness was most frequent (74.5%) clinical characteristics followed by vomiting (60.5%). Headache was reported by more than 50% of patients.All the patients with GCS ≤ 8 had loss of consciousness. Incidence of other clinical symptoms was also greater in patients with severe GCS.Severe disability, vegetative state and death were more prevalent in elderly patients.Asher P et al[10] in 2020 conducted a study to investigate the epidemiological pattern of traumatic brain injury (TBI) in Government Medical College, Thriruvananthapuram, He found out of 658 patients included in the study, majority of the subjects belonged to the age group 30-60 years. About 80% ofsubjects were males. 63% were manual labourers. Majority of the patients had about 10-15 days stay in the hospital. Road traffic accidents were the most common mechanism of injury and involved two wheelers mainly. Lack of helmet and restraining seat belt was noted in a sizeable percent of the subjects. Loss of consciousness was the most common complaint and GCS in the majority of subjects ranged from 9-13. Subdural hematomas and haemorrhagic contusions were the most common CT findings. 39.7% of the patients had associated spinal injury. About 48% of the subjects were operated. There was 7% mortality. Road traffic accidents accounted for the majority of traumatic brain injury incidents and a sizeable portion of patients required expert neurosurgical care.

Conclusion

Patients with TBI are diverse and do not exhibit the risk variables recommended by guidelines when it comes to neurocranial injury. Given this and the ongoing technological advancements in radiology that frequently lead to improved pathology identification and characterization, it is essential to regularly update clinical guidelines.

References

1. Cifu D. Traumatic brain injury. In: Cifu DX, editor. Braddom's physical medicine & rehabilitation. 5th edition. Philadelphia: Elsevier, Inc.; 2016. p. 964, 974, 979–80, 984–8.
2. Donagi A, Bing Y. Road traffic accidents in Israel: A report prepared for the Conference on Road Traffic Accidents in Developing Countries, Mexico City, 9-13 November 1981, upon request of WHO. [Tel-Aviv]: State of Israel Israel Police. 1981
3. Gururaj G. Epidemiology of traumatic brain injuries: Indian scenario. Neurol Res.2002;24:24–8.
4. Oertel M, Kelly DF, McArthur D, Boscardin WJ, Glenn TC, Lee JH, et al. Progressive haemorrhage after head trauma: Predictors andconsequences of the evolving injury. J Neurosurgery.2002;96:109–16.
5. Bajracharya A, Agrawal A, Yam B, Agrawal C, Lewis O. Spectrum of surgical trauma and associated head injuries at a university hospital in eastern Nepal. J Neurosci Rural Pract. 2010;1:2–8.
6. Gururaj G. Burden of disease in India: Equitable development—Healthy future. New Delhi: National Commission on Macroeconomics and Health, Ministry of Health and Family Welfare, Government of India; 2005. Injuries in India: A National Perspective; pp. 325–47.
7. James SL TA, Ellenbogen RG, Bannick MS, Montjoy-Venning W, Lucchesi LR, et al. Global, regional, and national burden of traumatic brain injury and spinal cord injury, 1990- 2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet Neurology. 2019;18(1):56-87
8. Laccarino C, Carretta A, Nicolosi F, MorselliC.Epidemiology of severe traumatic brain injury.Journal of Neurosurgical Science. 2018; 62(5):535- 41.
9. Raghavendra B. A clinico-epidemiological study of traumatic brain injury. International Journal of Surgery. 2019; 3(3):88-93.
10. Asher P, Joseph JJ, Pendro VS, Peethambaran A, Prabhakar RB. Epidemiological study of traumatic brain injury in a tertiary care centre in South India. International Surgery Journal. 2020 Sep 23; 7(10):3311-4.