DOI: 10.14260/jemds/2014/2355

ORIGINAL ARTICLE

A STUDY OF TRAUMATIC BRAIN INJURIES AT A TERTIARY CARE HOSPITAL IN KARNATAKA, SOUTH INDIA.

Hariprakash Chakravarthi[1], Paparaju Murthy[2], Venkatarathnamma P. N[3], Chandrashekara M. N[4]

HOW TO CITE THIS ARTICLE:
Hariprakash Chakravarthi, Paparaju Murthy, Venkatarathnamma P.N, Chandrashekara M.N, "A Study of Traumatic Brain Injuries at a Tertiary Care Hospital in Karnataka, South India". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 14, April 07; Page: 3750-3757, DOI: 10.14260/jemds/2014/2355

ABSTRACT: OBJECTIVE: To analyze the causes, various risk factors and treatment outcomes of traumatic brain injuries in a tertiary care hospital. **METHOD:** A Retro-prospective study from January 2012 till August 2013 (20months) was conducted at a rural medical college Hospital. Also data was retrieved from medical records on demographics, clinical, radiological and outcome status. **RESULTS:** A total of 788 TBI were admitted. Mean age of patients was 35.47 years, 88.83% percent were male; 72% of all the victims were in the age 15-45 years, overall fatality was 4.3 %; males were higher among fatal cases; Road traffic injuries were the commonest injury mechanism (93.65%). **CONCLUSION:** Trauma is the leading cause of death and disabilities worldwide, especially in children and young adults. Minor head injury constituted to about 60.4% and severe head injury constituted to about 12.18%.

KEYWORDS: Traumatic brain injury (TBI), Closed head injury (CHI), Subdural hematoma (SDH), Extradural hematoma (EDH), Road traffic injuries (RTI).

INTRODUCTION: Traumatic brain injury (TBI) refers to the potential for significant injury to the brain parenchyma following head trauma. Epidemiological surveillance reveals the changing nature of TBI over time. The centers for Disease Control and Prevention has termed traumatic brain injury (TBI) the "silent epidemic, "of developed nations.[1]India has highest rates of intracranial injury from road traffic, falls and other injuries. In India RTI happens one in every minute and RTI related death every 4 mins.[2] Traumatic brain injury according to the World Health Organization, will surpass many diseases as the major cause of death and disability by the year 2020. TBI is a leading cause of mortality, morbidity, and socioeconomic losses in India.[3] Globally the incidence is increasing, due mainly to greater use of motor vehicles in low- and middle-income countries.[4]

OBJECTIVES:

1. To analyze the causes and various risk factors associated with TBI.
2. Treatment outcome.

Inclusion criteria: All patients of head injury admitted to neurosurgery wards.

Exclusion criteria: All the patients who had lacerations, other polytrauma, facial injuries, birth injuries, stroke and non-traumatic intracranial hemorrhage.

METHODOLOGY: This is a Retro-prospective study, conducted at R.L.Jalappa Hospital and Research Centre, attached to Sri Devaraj URS Medical College, Kolar, having a Neurosurgery unit. This is a tertiary care hospital which provides emergency neurosurgical care, situated in a rural

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area of Karnataka state in South India. In this study 788 TBI cases from January 2012 to August 2013(20 months) were admitted. The time interval between injury and arrival to emergency room was from 30 min to 2 hours. In addition to the history of trauma, headache, seizures, loss of consciousness, amnesia, vomiting, and dizziness was also obtained. CT scan of brain was done in all TBI cases. All patients were resuscitated at emergency room initially and later shifted to neurosurgery intensive care. A total of 96 patients underwent emergency neurosurgical operations.

Most patients (24, 25%) had combinations of different intracranial hematomas and depressed fracture of skull, acute subdural hematomas (36, 37.5%), cerebral contusions, subarachnoid hemorrhage and extradural hematoma (36, 37.5%). Among EDH, clot volume >30 cm^2 at cerebral level[5] and diameter >3 cm at cerebellar region[6] were included for craniotomy and clot evacuation.

Clinically TBI severity was grouped into 3, based on Glasgow coma score:

Mild TBI: GCS 13-15

Moderate TBI: GCS 9-12

Severe TBI: GCS 8 or less

RESULTS:

There were total 788 cases (n=788) of TBI, 700 male (n=700) and 88 female (n=88) over 20 months of study period.

0-14 years	16	2%
15-25 years	207	26.1%
26-35 years	208	26.2%
36-45 years	162	20.5%
46-55 years	97	12.3%
56-65 years	48	6%
>65 years	49	6.2%
Total (n=788)	788	100%

Table 1: Age distribution

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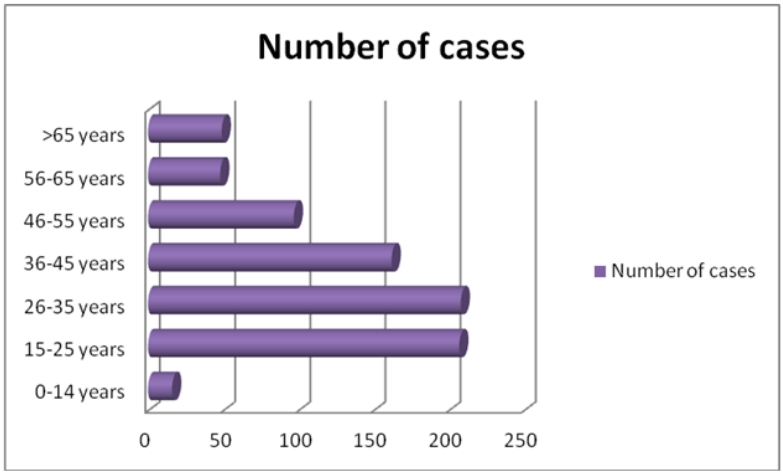

Figure 1: Age distribution

Road traffic accident	738 (93.65%)
Falls	42 (5.3%)
Assault	8 (1.0%)
Total	788 (100%)

Table 2: Mode of injuries

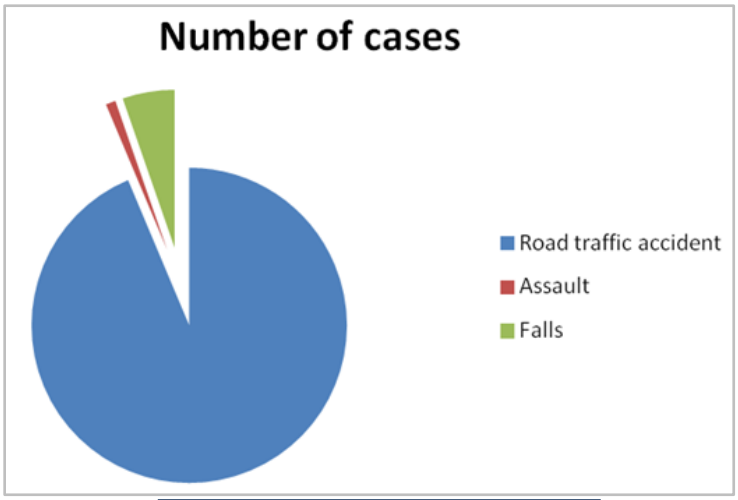

Figure 2: Mode of injuries

Group	Total cases:788	Total mortality: 34
Minor TBI	476(60.4%)	4(0.8%)
Moderate TBI	216(26.60%)	12(5.5%)
Severe TBI	96 (12.18%)	18(18.7%)

Table 3: Pattern of head injuries and mortality

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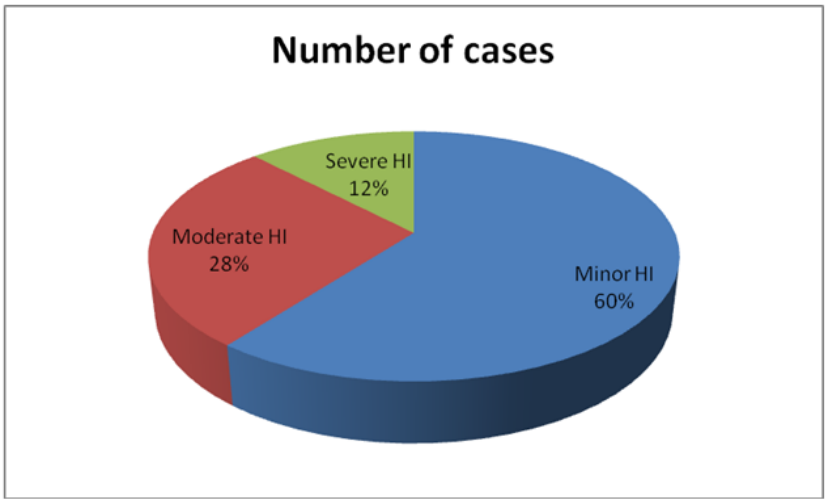

Figure 3: Pattern of head injuries

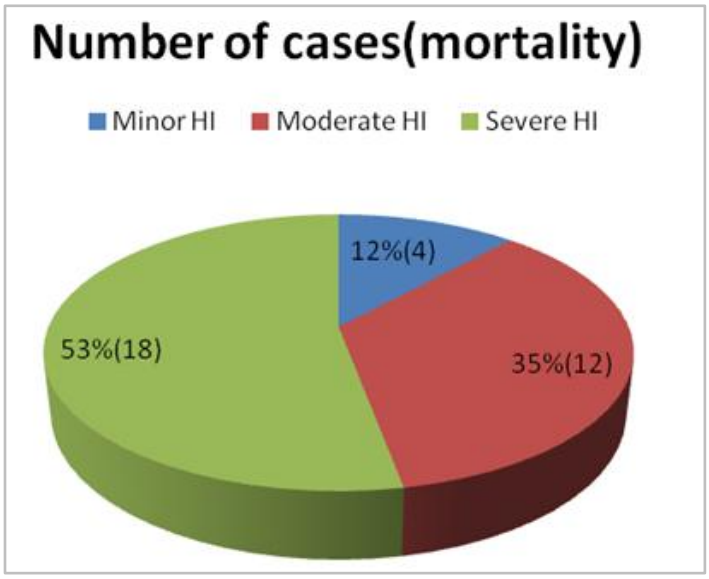

Figure 4: Pattern of head injuries and mortality

Pattern of mortality	Mortality (Total 34 cases)	Percentage (%)
Early death: <48 hours	14	41.1%
Within 2-7 days of admission	12	35.2%
Late death > 7 days	08	23.5%

Table 4: Pattern of mortality

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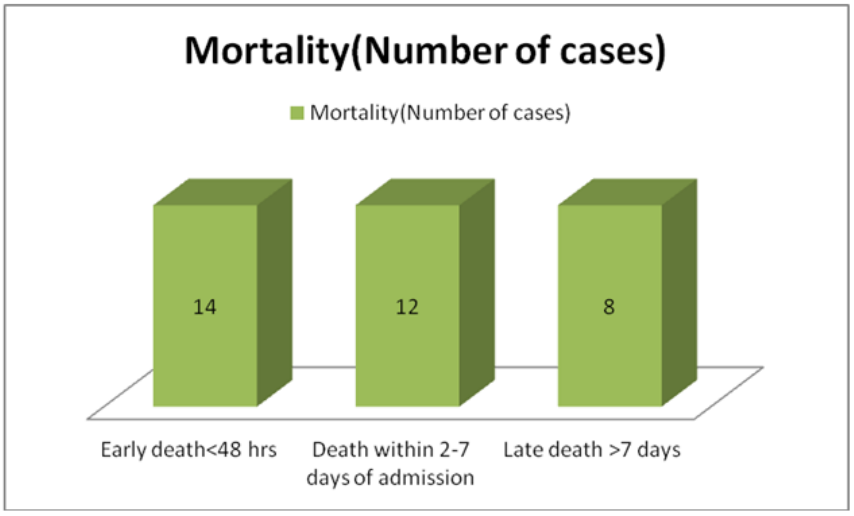

Figure 5: Pattern of mortality

Group	No. of mortality (Total 34)	Percentage (%)
Age <18years	10	29.4%
Adults 20-50 years	15	44.11%
Elderly >65 years	9	26.4%

Table 5: Age distribution of mortality

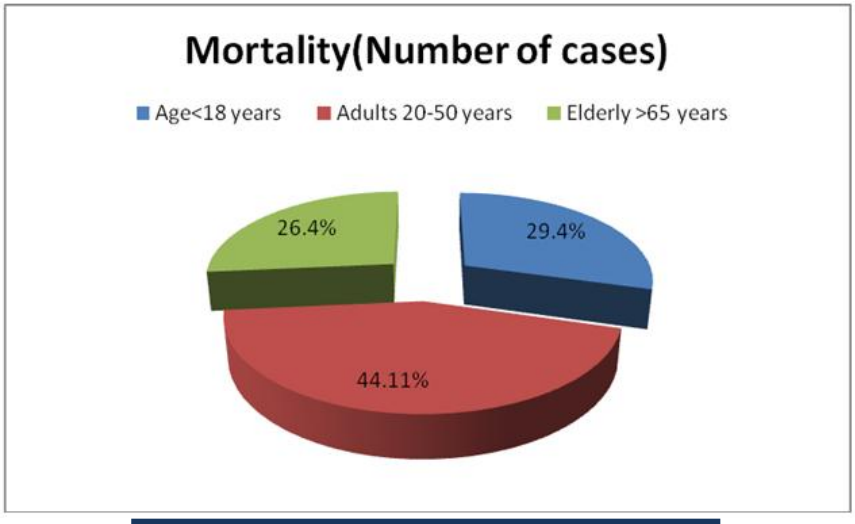

Figure 6: Age distribution of mortality

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Glasgow outcome score in severe head injury	Total: 96
Death	20(20.8%)
Vegetative	12(12.5%)
Severe disabled	22(22.9%)
Moderate disabled	12(12.5%)
Good recovery	30 (31.2%)

Table 6: All subjects were evaluated at hospital discharge time with Glasgow Outcome Scale.[7]

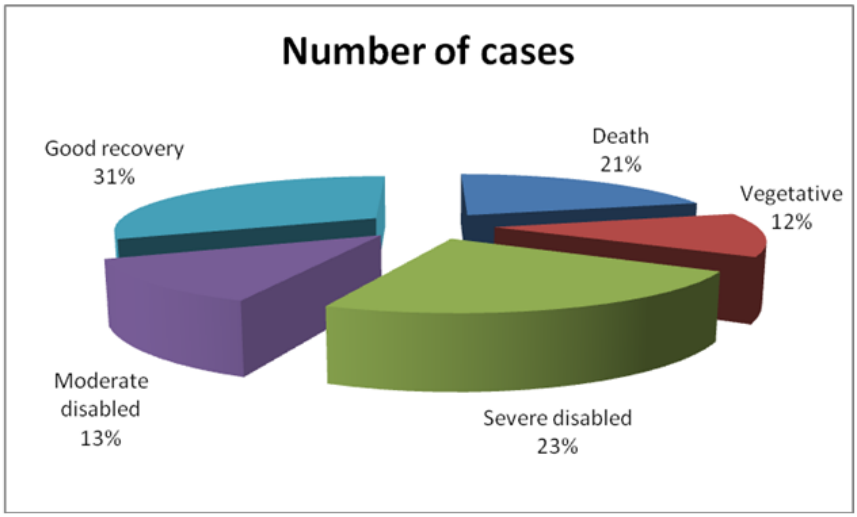

Figure 7: All subjects were evaluated at hospital discharge time with Glasgow Outcome Scale.[7]

Out of a total 788 TBI cases, the mean age was 35.47 years, 88.83% were male; 72% of the victims were in the age 15-45 years that comprised the large group; children (0–14 years, 2%) and elderly >65years 6.2%; 12.18% required resuscitation on admission; the mean duration of hospital stay was 7.2 days. The overall fatality was 4.3 %; males were higher among fatal cases; Road traffic injuries were the commonest injury mechanism (93.65%) mainly in the highways, next being falls(5.3%, falls in public places, falls at home, falls from stairs and fall from building,) and violence(1%, with blunt physical objects).

Major associated injuries were found in 12 cases, i. e. ear, nose and throat bleed, limb and chest injuries (1.5%).

Alcohol was risk factor in 8 % cases.

DISCUSSION: TBI is the leading cause of death and disabilities worldwide, especially in children and young adults.[8] Worldwide, TBI has devastating effects on patients, their family and community.[9] In this study severe disability was found in 2.79%. Injuries are responsible for nearly one third of all disabilities and RTIs contribute nearly half of them.[10] National Sample Survey Organization estimate that nearly 2% of the Indian population are disabled.[11] The rapid economic, demographic, and social

transformation of India in recent decades has resulted in the burden of epidemics of infectious diseases and rising rates of chronic diseases, combined by Neurologic disability due to increase in TBI. [12]

Following TBI, the outcome is multidimensional, i.e. it includes neurophysical disabilities, disturbances in cognitive and executive functioning which in turn results in problems in social reintegration. Depression and anxiety disorders are common in survivors. Substance abuse is common and is a contributing factor for injury.

WHO estimates that 100% of severe, 50% of moderate and 10% of mildly injured persons need long term rehabilitation services.[13]

CONCLUSION: Traumatic brain injuries are a leading cause of morbidity, mortality, disability and socio-economic losses in India. In the present study, it is observed that young men in the age group of 15 to 45 years are at an increased risk of brain injury, RTI and falls were the leading causes. Alcohol consumption has been found to be a major risk factor. The present study's mortality rates are similar to those observed by Kagan RJ [14] and Fakhry SM[15], minor HI carries less mortality.

Speed control, use of helmets, no drinking while driving, implementing strict safety laws and improving trauma care, are some of the measures which can be implemented.

There is further need to maintain, analyze and to update continuously for a national TBI registry.

This is phase I study only.

REFERENCES:

1. Traumatic Brain Injury in the United States A Report to Congress. Centre for Disease Control and Prevention; Atlanta, GA: 2001.
2. Road accidents in India 2010, Government Of India, Ministry Of Road Transport And Highways, Transport Research Wing, New Delhi.
3. Gururaj G. Epidemiology of traumatic brain injuries: Indian scenario. Neurological Research 2002; 24:24-8.
4. Maas A.I et al. Standardizing data collection in traumatic brain injury. J Neurotrauma (2011) 28, 177–187.
5. Ismail Yurt, Hamdi Bezircloglu, Yusuf Ersahin et al. Extradural Hematoma: analysis of 190 cases. Turkish Neurosurgery 1996; 6: 63-67.
6. Ihsan Anik, Halil Ibrahim Secer, Yonca Anik, Bulent Duz, Engin Gonul. Meta analyses of intracerebral hematoma treatment. Turkish Neurosurgery.2011; Vol: 21:No.1:6-14.
7. Anderson SI, Housley AM, Jones PA, Slattery J, Miller JD. Glasgow Outcome Scale: an inter-rater reliability study. Brain Inj. 1993 Jul-Aug; 7(4):309-17.
8. DeKosky ST, Ikonomovic MD, Gandy S. Traumatic brain injury – football, warfare, and long-term effects. N Engl J Med 2010; 363: 1293–6.
9. Gururaj G and Sastry KVR. Problem and determinants of traumatic brain injuries in India. NIMHANS Journal, 17(4), 1999, 407 - 422.
10. National Sample Survey Organization. Disability in India. NSSO 58th round. New Delhi: Ministry of Statistics and Programme Implementation, Government of India; 2003.

DOI: 10.14260/jemds/2014/2355

11. Gururaj G. Injuries in India: A national perspective. In: 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; 2005:325–47.
12. Abhijit Das, Amanda L. Botticello, Glenn R. Wylie, Kurupath Radhakrishnan, Global Perspectives 2012 American Academy of Neurology 79 November 20, 2012: 2146 -2147.
13. World Health Organization Collaborating Centers for Neurotrauma. Prevention, critical care and rehabilitation of neurotrauma—Perspectives and future strategies. Geneva: World Health Organization; 1995.
14. Kagan RJ, Baker RJ. The impact of the volume of neurotrauma experience on mortality after head injury. Am Surg. 1994 Jun; 60(6): 394-400.
15. Fakhry SM, Trask AL, Waller MA, Watts DD. Management of brain-injured patients by an evidence-based medicine protocol improves outcomes and decreases hospital charges. J Trauma 2004 Mar; 56(3):492-9.

AUTHORS:

1. Hariprakash Chakravarthi
2. Paparaju Murthy
3. Venkatarathnamma P. N.
4. Chandrashekara M. N.

PARTICULARS OF CONTRIBUTORS:

1. Consultant Neurosurgeon, Department of Neurosurgery, M. S. Ramaiah RL Jalappa Hospital, Tamaka, Kolar, Karnataka, India.
2. Consultant Neurosurgeon, Department of Neurosurgery, Sri Devaraj Urs Academy of Higher Education and Research, Tamaka, Kolar.
3. Professor, Department of Medicine, Sri Devaraj Urs Academy of Higher Education and Research, Tamaka, Kolar.
4. Associate Professor, Department of Neurology, Sri Devaraj Urs Academy of Higher Education and Research, Tamaka, Kolar.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Venkatarathnamma P. N,
Professor, Department of Medicine,
Sri Devaraj Urs Academy of Higher Education and Research, Tamaka, Kolar.
E-mail: drpnvr@gmail.com

Date of Submission: 18/02/2014.
Date of Peer Review: 19/02/2014.
Date of Acceptance: 19/03/2014.
Date of Publishing: 07/04/2014.