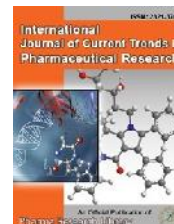




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Case Study

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Traumatic Brain Injury, the Major Cause of Death in Young Adults- A Case Study

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ABSTRACT

Traumatic brain injury is of the major cause of death in young adults and its of neurology health problem, especially among male adolescents and young adults ages 15 to 24, and among elderly people of both sexes 55 years and older. Children aged 7 and younger are also at high risk for TBI. Cases of head injury is more seen in males patients comparison to females. Generally caused by motor vehicle accident, fall assault, Violence and sports. Head injury defines an injury to the head and brain. Hence injury o head which does not involve the brain, is not considered as head injury, It is not unusual for a neurosurgeon to get a call for treating a head injured patient from casualty which turns out be a simple case of scalp laceration or scalp hematoma. 61% of people not use seat belt, 45% people not bear helmet especially in rural area, 20% people drink liquar while those are driving, 2% cases of accident cause high speed of vehicle.

Keywords: Traumatic brain injury, Head injury, Scalp hematoma

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1. Introduction

Traumatic brain injury (TBI) is of the major cause of death in young adults and its of neurology health problem, especially among male adolescents and young adults ages 15 to 24, and among elderly people of both sexes 55 years and older. Children aged 7 and younger are also at high risk for TBI. Cases of head injury is more seen in males patients comparison to females. Generally caused by motor vehicle accident, fall assault. Violence and sports. Perhaps the most common problem in patients after head injury, patient suffering from personality and behavior problem until his or her death. Although science still has much to learn about how to reverse damage resulting from head injuries.¹ Survivors of TBI are often left with significant cognitive, behavioral, and communicative disabilities, and some patients develop long-term medical complications, such as epilepsy fits. According to National crime records, 35% cause death from head injuries.²

The India is in top in road traffic accidents. Every day approximately 500 people suffering from Traumatic brain injury and this condition increases year by year. 4.97 lakh road traffic accidents annually in India means every min one accident. Head injury defines an injury to the head and brain. Hence injury o head which does not involve the brain, is not considered as head injury, It is not unusual for a neurosurgeon to get a call for treating a head injured patient from casualty which turns out be a simple case of scalp laceration or scalp hematoma. [3] 61% of people not use seat belt, 45% people not bear helmet especially in rural area, 20% people drink liquar while those are driving, 2% cases of accident cause high speed of vehicle.

Head injury is a neurosurgical problem and operation if required, should be performed by a neuro surgeon, however the question then remains, is it practically possible that every head injury can be seen, diagnosed and treated by neurosurgeon.[4] Each year in India

- Approximately 4,97.686 people experience a moderate or severe TBI
- Approximately 1,42,485 people die from head injury,
- Approximately 1 million head-injured people are treated in hospital emergency room,
- Approximately 100000 new cases of seizures occur as a result of Traumatic brain injury.
- Approximately 430.000 people are hospitalized for TBI and survive from road traffic accident, and
- Approximately 100000 of these survivors live with significant disabilities as a result of the injury.
- Traumatic brain injury is the leading cause of death and deformity in worldwide

Large number of young people dies which does not evoke much reaction except occasional photos and writes up in news paper.[5] School bus accidents have rocked India in last few years and there were several incidents in Delhi. People react, discuss for few days then forget, till another school bus disaster takes place.

Table 1: Shows that how much fund provide for different disease by the government

Disease	Death	Provide Fund in (2002-2007)
T.B	37,639 (2004)	680 CRORE
Malaria	638(2005)	1,370 CRORE
Aids	1094 (2005)	1,370 CRORE
Road accident	92,618 (2004)	187 CRORE

Literature Review

TBI, also called acquired brain injury or simply head injury, occurs when a sudden trauma causes damage to the brain. The damage can be focal confined to one area of the brain or diffuse involving more than one area of the brain. TBI can result from a closed head injury or a penetrating head injury. [6,7] A closed injury occurs when an object pierces the skull and enters brain tissue. The high incidence of head injuries resulting from transportation system crashes, sports, military activities, falls, assaults, etc. contributes to a preponderance of head injury biomechanics research.⁸ A wealth of publications result, addressing phenomenological and mechanistic issues associated with head response to mechanical impact. This literature survey provides an assessment of hypothesized brain injury mechanisms, brain injury criteria, mathematical models of head injury and available techniques for measuring head kinematics and brain tissue deformations associated with exposure to dynamic loads: [9,10]

TBI can be mild, moderate, or severe, depending on the extent of the damage to the brain. Some symptoms are evident immediately, while others do not surface until several days or Weeks after the injury. A person with a mild TBI may remain conscious or may experience a loss of consciousness for a few seconds or minutes. The person may also feel dazed or not like himself for several days or weeks after the initial injury, Other symptoms of mild TBI include headache, confusion, light headedness, dizziness, blurred vision or tired eyes, ringing in the ears, bad taste in mouth, fatigue or lethargy, a change in sleep patterns, behavioral or mood changes, and trouble with memory, concentration, attention, or thinking. [11,12]

Half of all TBIs are due to transportation accidents involving automobiles, motorcycles, bicycles, and pedestrians. These accidents are the major cause of TBI in people under age 75. For those 75 and older, falls cause the majority of TBIs. Approximately 20 percent of TBIs are due to violence, such as firearm assaults and child abuse, and about 3 percent are due to sports injuries. Fully half of TBI incidents involve alcohol use. The cause of the TBI plays a role in determining the patient’s outcome. For example, approximately 91 percent of fire arm TBIs (two-thirds of which may be suicidal in intent) result in death, while only 11 percent of TBIs from falls result in death.¹³ Concussion is the most common type of TBI. Technically, a concussion is a short loss of consciousness in response to a head injury, but in common language the term has come to mean any minor injury to the head or brain. Other injuries

are more severe. As the first line of defense, the skull is particularly vulnerable to injury. Skull fractures occur when the bone of the skull cracks or breaks.¹⁴ A depressed skull fracture occurs when pieces of the broken skull press into the tissue of the brain. A penetrating skull fracture occurs when something pierces the skull, such as a bullet, leaving a distinct and localized injury to brain tissue. Skull fractures can cause bruising of brain tissue called a contusion. A contusion is a distinct area of swollen brain tissue mixed with blood released from broken blood vessels. A contusion can also occur in response to shaking of the brain back and forth within the confines of the skull, an injury called “countercoup”. This injury often occurs in car accidents after high-speed stops and in shaken baby syndrome, a severe form of head injury that occurs in when a baby is shaken forcibly enough to cause the brain to bounce against the skull. In addition, countercoup can cause diffuse axonal injury, also called shearing, which involves damage to individual nerve cells (neurons) and loss of connections among neurons. This can lead to a breakdown of overall communication among neurons in the brain. Damage to major blood vessel in the head can cause a hematoma, or heavy bleeding into or around the brain. Three types of hematomas can cause brain damage. An epidural hematoma involves bleeding into the area between the skull and dura¹⁵ with a subdural hematoma, bleeding is confined to the area between the dura and the arachnoid membrane. Bleeding within the brain itself is called intra-cerebral hematoma. Another insult to the brain that can cause injury is anoxia. Anoxia is a condition in which there is an absence of oxygen supply to an organ’s tissues, even if there is adequate blood flow to the tissue. Hypoxia refers to a decrease in oxygen minutes. This type of injury is often seen in near drowning victims, in heart attack patients, or in people who suffer significant blood loss from other injuries that decrease blood flow to the brain.^{16,17}

2. Objectives

- Proportional morbidity, mortality and case fatality rates for TBIs.
- Magnitude and role of various external causes and risk factors in the occurrence of TBIs.
- Pattern and pathways of pre hospital and emergency care
- Nature of interventions among hospital registered and admitted subjects.
- Various disabilities among subjects with TBI at the time of hospital discharge and at
- Follow-up periods of one year and two years.
- Economic impact of TBI from a sample of total patients.
- Head trauma now represents a major cause of death and disability among young otherwise healthy people, and it is claimed that it is more common than ever.
- Radiographs are now replaced by CT scanning as the primary method of assessing head trauma.
- Analysis of different stages of head trauma (subdural, extradural, subarachnoid, epidural etc)

and fractures of head in the suspected head trauma patients.

- All the intracranial sequelae of acute head trauma are documented and analyzed, where the males are found to be involved in 78% of the cases, and in up to 60% of the cases the victims are in the first three decades of life, RTA- the main cause shows a dramatic increase compared with other studies.
- A localized brain oedema, contusions, and intra cerebral hematomas are the most commonly found sequelae, while other sequelae such as subarachnoid hematomas, subdural hematomas, and epidural hematomas are encountered less. Diffuse brain swelling as has been declared in other studies is more common among children.
- To work out the effectiveness of head trauma in the road side accident patient during the study period.

Hypothesis

After the advent and use of robotic surgery the roll of ct in the skull trauma has been elaborated. The modern neurosurgery method require perfect and precision of ct evaluation, The role of technological personnel who perform the ct exam and radiologist has elaborated their responsibility.^{18,19} Players, scientist, technocrats and high politician and the industrialist suffering from skull trauma and its perfect outcome has shoulders great responsibility on the treating medical team based on ct evaluation.²⁰ The present research work is intended to improve our understanding of traumatic brain injury (TBI). It is our hypothesis that vulnerable populations carry the mutual burdens of TBI for which there are shared, modifiable risk factors.

Work Plan and Research Methodology

This study shall be based on patient admitted in Emergency department and outdoor neurosurgery, surgery and orthopedics with history of road side accident patients in UPRIMS&R, Saifai, Etawah. Siemens (SOMATOM sensation 64 slice) C.T machine is available in our Department of Radiology. C.t is the most important step in evaluation for head injuries. In ct head brain window to assess the subdural, extradural and epidural haematomas and bone window to determine the presence or absence of a bony fracture. CT of Head will be done by Radiographer and Reporting by Radiologist. The general and relevant clinical examination will be carried out. The C.T examination shall be performed. After recommendation of treating clinician. Basically non contrast CT will be performed in all the cases. The contrast examination will only be required unless there is specific indication - history of hypertension, past history of neurological deficit.

1. Soft tissue injury,
2. Types of hematoma and
3. Extent of bone injury,

Head trauma now represents a major cause of death and disability among young otherwise healthy people, and it is claimed that it is more common than ever. Radiographs are now replaced by CT scanning as the primary method of assessing head trauma, but MRI might be needed too.

Patients a retrospective study has been carried out of 50 cases of acute head trauma with positive CT scanning referred to U.P Rural Institute Of Medical Science And Research, Saifai, Etawah, UP, India Results all the intracranial sequelae of acute head trauma are documented and analyzed, where the males are found to be involved in 78% of the cases, and in up to 60% of the cases the victims are in the first three decades of life, RTA-the main cause shows a dramatic increase compared with other studies. Fractures are present in the majority of the cases indicating a significant trauma, moreover, more than one sequelae can be detected in many cases. A localized brain oedema, contusions, and intra cerebral hematomas is the most commonly found sequelae, while other sequelae such as subarachnoid hematomas, subdural hematomas, and epidural hematomas are encountered less. Diffuse brain swelling as has been declared in other studies in more common among children. CT scanning remains the first diagnostic imaging tool to detect the different intracranial post-traumatic lesions of acute head trauma, many of which are life-threatening, on the other hand, MRI is spared for full assessment of head trauma, and for follow up too.

3. Discussion

It has been noticed in patients with multiple injuries that head is the most commonly injured part, and in fatal RTAs, injury to the brain is found in 75% of victims at autopsy, where most of the serious head traumas occur in people under age of 30 years of age. A male predominance is obvious, where males constitute 78%, (39cases). And the female victims constitute 22% (only 11 cases).

The male to female ratio is almost 4:1, compared with other series showing 3:1 and 3:1.5 respectively, where males are seen to be involved more in all age groups. This discrepancy reflected more involvement of males in the social, and economic life, in spite of the female predominance observed in our community. This study elicits that the highest incidence of cases is in the first decade, constituting 30%, while the fifth, sixth, and seventh decades collectively form only 28%, whereas, more than half of the total cases, a 60% occur in the first three decades of life, where the children and young adults were the main victims of acute head trauma in 61% of cases.

Generally, in this study, there is a decrease in the incidence of head trauma with increasing age, except for the second decade. In other two separate studies, pediatric age group constituted 53% and 39% respectively. This series shows that more than two thirds of the cases are due to road traffic accidents (RTA) constituting 86% of all cases, whereas, fall from height (FFH), and bullet injuries constitute 8% and 6% respectively, The high incidence of RTAs reflects a high contribution to the etiology which is indeed an almost double of that figure found in a previous study a 46%. Many authors have noted that in children RTA, and FFH are the main causes in acute head trauma, while in adults assaults are added too. However, there are authors who considered falls as the main cause of acute head trauma.

The steep raise in the incidence of acute head traumas is, probably, reflecting an increasing number of vehicles on badly paved roads with ignorance of commitment to the traffic regulations and laws. There is a lot of debate concerning the significance of finding a fracture in the post-traumatic skull radiographs, however, no much stress is laid on this point since the majority of the cases were referred immediately for an urgent CT. IN this study 82% of the cases are associated with fractures, while, the non-fractured cases constitute 18% only, this high incidence might be explained on the basis of severity, and the selectivity of the cases. A fracture on radiography indicates a significant force has applied to the bony vault. However, the lack of visualization of a fracture does not exclude a significant injury to the underlying brain; therefore, a skull fracture may or may not indicate a brain injury. The literature shows an incidence of 2%-42% of fractures in acute head trauma.

4. Significance of Research

Comprehensive research in India in the area of Traumatic Brain Injuries (TBIs) is extremely limited. Scientific information in this area is vital and a basic prerequisite to understand the enormity of the problem and its various determinants and various dimensions to formulate, implement and evaluate programs for reduction of morbidity, mortality, disability and socioeconomic losses in every country. Earlier research in India has been extremely limited and has been from isolated settings based on personal areas of interest by individual researchers. Injuries are a major public health problem today. Injuries and TBIs in India have been increasing significantly due to rapid motorization, industrialization, migration and changing value systems of Indian society. The consequences on health are tremendous and have been underestimated due to absence of research. Apart from instantaneous deaths, the suffering and poor quality of life among survivors is a living testimony to the impact of TBIs.

The contents focus on the characteristics of the injured persons, where did it occur? How did it occur? Why did it occur?, nature of pre hospital and emergency care, course during hospital stay and nature – impact after discharge. As hospital based follow-ups were not adequate in terms of coverage, domiciliary interviews were conducted for in – depth interviews of patients and family members. Broadly, the findings of the study cover important issues related to prevention, management and rehabilitation along with identifying new areas for research. The various recommendations placed at the end of the report needs immediate attention of political leaders, policy makers and professionals. This publication is also intended to stimulate and encourage research in the area of TBIs in India and other developing countries. “Accidents are no more accidents” Unraveling the factors – causes, situations, circumstances, is crucial to initiate action in a scientific way. This understanding is also crucial to move from present pessimistic attitudes to more optimistic thinking in the area of prevention and rehabilitation. We hope that our efforts will be amply rewarded if readers consider promoting and conducting research in this area along with

placing injuries and TBIs on public health agenda of their respective communities.

Pathological Types of Intracranial Sequelae Seen on Ct Scanning: The neuro radiology of trauma has undergone a dramatic change since the advent of CT scanning, which is regarded now as the primary method of assessing head injury, supplemented by a lateral radiograph of cervical spine⁴. In the early reports, it was established that generally there was direct relationship between the severity of clinical presentation, and the demonstration of abnormalities, 8 where all the cases in this series show one or more post-traumatic sequel, indicating a considerable severity, and it was estimated that up to 60% of this study showed two or even three intracranial sequelae, such as an epidural, and an intra-cerebral hematomas, or a subarachnoid, a subdural, and an intra-cerebral hematomas all together. The incidence of abnormal CT findings are variable in different series ranging from 37%, 73%, 86%, 98%.

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