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Original Research Article

Epidemiology of surgically managed traumatic brain injury patients

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ABSTRACT

Background: Traumatic brain injury (TBI) constitutes a major health and socioeconomic problem throughout the world TBI is called the 'silent epidemic' because problems resulting from TBI are often not immediately visible and TBI patients are not very vociferous. Epidemiological studies of TBI are essential to the targeted prevention and effective treatment of brain-injured patients.
Materials and Methods: Epidemiology analysis of surgically managed traumatic brain injury patients was done.
Results: Mean age was 35.9 years. Males were more commonly (80%) involved than females (20%). In 57.5% of cases, falls were responsible for TBI and in 42.5% of cases, Road traffic accidents were responsible. Edh was the most common type of TBI in (50%). Chronic SDH occurred in 25% of cases. Acute SDH and Contusions were both seen in 13.75% of cases. Depressed fractures occurred in 6.25% of cases and ICH occurred in 1.25% of cases. Craniotomy was the most common (42%) surgical procedure performed, followed by burrhole drainage (22.5%). Decompressive craniectomy was done in 18.75% of cases and elevation of depressed fracture was performed in 6.25% of cases.
Conclusions: Traumatic brain injury (TBI) constitutes a major health and socioeconomic problem throughout the world. People of all ages are affected by it. Males are more commonly involved as compared to females. Timely hospitalisation and surgical management whenever indicated improves the survival.

1. Introduction

Traumatic brain injury (TBI) constitutes a major health and socioeconomic problem throughout the world.[1,2] It is prevalent in both low and high-income countries and affects people of all ages. TBI is called the 'silent epidemic' because problems resulting from TBI are often not immediately visible and TBI patients are not very vociferous. The term 'silent' further reflects the common underestimation of the actual incidence and that society is often unaware of the impact of TBI.[3] Traumatic brain injury (TBI) has been one of the leading causes of morbidity, disability and mortality across all ages (Bruns and Hauser, 2003; Dewan et al., 2018).[4,5] Globally, more than 50 million individuals suffer from TBIs each year (Maas et al., 2017).[6] As of 2005, approximately 3.17 million TBI survivors experience post-traumatic complications ranging from neurological, psychosocial problems to long-term disability (Zaloshnja et al., 2008; Bazarian et al., 2009).[7,8]

Damages of neuronal tissues associated with TBI fall into two categories: (i) primary injury, which is directly caused by mechanical forces during the initial insult; and (ii) secondary injury, which refers to further tissue and cellular damages following primary insult. Primary Brain Injuries The immediate impact of different mechanical insults to the

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brain can cause two types of primary injuries: focal and diffuse brain injuries.

Studies have demonstrated that the co-existence of both types of injuries is common in patients who suffered from moderate to severe TBI (Skandsen et al., 2010).[9] Studies have demonstrated that as a consequence of lacerations, compression and concussion forces, closed head TBI and penetrating TBI exhibit focal brain damage with evidence of skull fracture and localized contusion at the core of injury site (coup; Schmidt et al., 2004).[10] Necrotic area of neuronal and glial cells is concentrated at the coup with compromised blood supply causing the occurrence of hematoma - epidural, subdural and intracerebral hemorrhages at confined layers of the brain. Secondary contusion may develop in tissues opposite to or surrounding the coup (contre-coup) due to secondary impact when the brain rebounds and strikes the skull (Schmidt et al., 2004).[10]

Depending on the severity of the injury, it can lead to cognitive deficits, behavioural changes and hemiparesis. In contrast to focal injury, the main mechanism of diffuse brain injury is non-contact forces of rapid deceleration and acceleration which cause shearing and stretching injury in cerebral brain tissues.

Epidemiological studies of TBI are essential to the targeted prevention and effective treatment of brain-injured patients. 'Traumatic brain injury' has replaced the former term 'head injury' as it better captures the importance of the 'brain'.[11]

TBI was recently defined as: 'An alteration in brain function, or other evidence of brain pathology, caused by an external force'.[12] Tagliaferri et al.,[13] conducted a systematic review on the epidemiology of TBI in Europe in 2006. In their review they analysed 23 studies published between 1980 and 2003.

An aggregated (i.e. fatal plus hospitalised) incidence rate of 235 cases per 100,000 people per year, an average mortality rate of 15 per 100,000 people per year and a case fatality rate of 2.7% were calculated.

In the past decade, new insights into the epidemiology of TBI have emerged. Epidemiological patterns appear to be changing with an increasing incidence of TBI in the elderly. Various reports claim that mortality in TBI is decreasing.[14] The purpose of this systematic review is to provide a contemporary overview of epidemiology of TBI Patients.

2. Materials and Methods

Surgically managed patients of traumatic brain injuries were included in this study.

2.1. Inclusion criteria

Patient of traumatic brain injuries requiring surgical management

Patients admitted were thoroughly analysed.

Patient demographic features, type of traumatic brain injury sustained and the surgical management instituted were analysed.

Detailed statistical analysis of collected data was done.

3. Observations

Table 1: Age distribution

Age groups (years)	Frequency	Percentage (%)
0 - 19.9	19	23.8
20 - 39.9	27	33.8
40 - 59.9	20	25
60 - 79.9	13	16.2
80 - 99.9	1	1.2

Table 2: Gender distribution of cases

Sex	Frequency	Percentage (%)
Male	64	80
Female	16	20

Table 3: Etiology of traumatic brain injury

Etiology	Frequency	Percentage (%)
Fall	46	57.5
RTA	34	42.5

Table 4: Type of Traumatic Brain Injury (TBI)

Type of TBI	Frequency	Percentage (%)
Acute SDH	11	13.75
ICH	1	1.25
Contusions	11	13.75
Chronic SDH	20	25
EDH	40	50
Depressed fracture	5	6.25

4. Discussion

Mean age was 35.9 years in our study indicating that traumatic brain injuries are more common in younger age groups. Styrke et al.(2007)[15] reported a mean age of 22 years, while Mauritz et al. (2008)[16] reported a mean age of 49 years.

Males were more commonly (80%) involved than females (20%) in our study. This finding is seen in most of the studies.[16,17]

In our study in 57.5% of cases, falls were responsible for TBI and in 42.5% of cases, Road traffic accidents were responsible. So, falls were more common cause of traumatic brain injuries in our study. Also falls were more commonly seen in old age and in childrens, with RTA being more

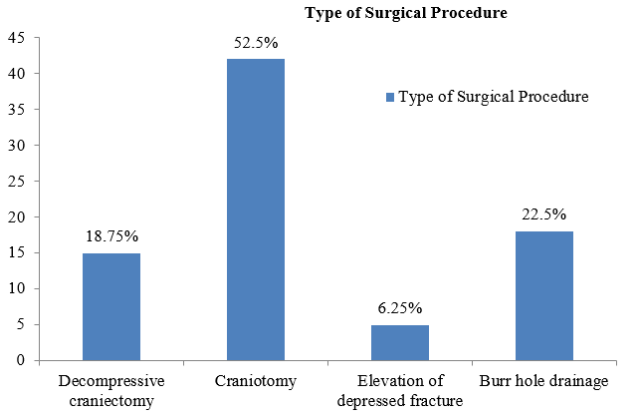

Fig. 1: Type of Surgical Procedure

common in young adults. In a study by Andelic et al, falls (51%)[18] were the most common cause of TBI. Similar findings were seen in studies by, Numminen (58.4%),[17] Heskestad et al.(51%),[19] Shivaji et al(47%)[20]and Rickels et al. (2010) (52.5%).[21]

Edh was the most common type of TBI in our study (50%). Chronic SDH occurred in 25% of cases. Acute SDH and Contusions were both seen in 13.75% of cases. Depressed fractures occurred in 6.25% of cases and ICH occurred in 1.25% of cases.

Craniotomy was the most common (42%) surgical procedure performed in our study, followed by burrhole drainage (22.5%). Decompressive craniectomy was done in 18.75% of cases and elevation of depressed fracture was performed in 6.25% of cases in our study.

Craniotomy was done for evacuation EDH in all the cases of EDH. AS indicated in another study craniotomy does provide more complete hematoma evacuation.[22] In our study, decompressive craniectomies were done in acute SDH, ICH and Contusions cases having mass effect and midline shift and clinical deterioration.

5. Conclusion

Traumatic brain injury (TBI) constitutes a major health and socioeconomic problem throughout the world.

It is prevalent in both low- and high-income countries

People of all ages are affected by it.

Males are more commonly involved as compared to females.

Timely hospitalisation and surgical management whenever indicated improves the survival.

6. Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

7. Source of Funding

None.

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