Original Research Article

Geriatric head injuries: impact and outcomes

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ABSTRACT

Background: Elderly trauma patients present unique challenges and face more significant obstacles in recovery than their younger counterparts. They usually experience higher morbidity and mortality and slower recovery trajectories and have, on average, worse functional, cognitive, and psychosocial outcomes months or years post-injury than do younger patients.

Methods: Authors conducted a study of elderly head injury patients to understand the epidemiology of geriatric TBI, the impact of comorbidities and management issues and outcomes in such patients. Authors had a total of 110 patients who presented with traumatic brain injury and were admitted in this hospital over 2 years. Authors also reviewed the literatures to study the factors affecting outcome after geriatric TBI and studied the role of aggressive neurosurgical management in geriatric TBI.

Results: Among 68%(n=75) of the patients were male and 32% females. Age group of 60-65 years was the highest with 60.9% patients. Patients with GCS of 8 and below had the highest mortality rates of 68 %. Overall mortality rate was 32.72% and 9.09 % of the patients survived in a vegetative condition. The proportion of injury secondary to fall was the largest single group in 50.9% patients, and Chronic SDH was the most common pathology seen in 36.45 % patients. Highest mortality was seen in patients with Diffuse Axonal Injury (69.23 %). Out of the 110 patients , 57 patients underwent surgery for various pathologies. Chronic SDH were the most common operated pathology followed by acute SDH. Glasgow outcome scale was used as the measure of outcome in these series of patients. 32.72 % patients had a GOS score of 1 and 9.09 % had a score of 2. 18.18 % patients remained severely disabled with a score of 3 and nine patients (8.18 %) had a score of 4 and thirty five patients had good recovery (GOS-5).

Conclusions: Due to the better treatment options there is an increase in the number of elderly around the world. Thus, the number of eldery individuals presenting with TBI to the emergency department is also on the rise more commonly due to falls than road traffic accidents. There is a need for specific prognostic and management guidelines for the elderly which can lead to better diagnosis, care and recovery and eventual short- and long-term outcomes in the elderly.

Keywords: Aged population, Chronic subdural hematoma, Elderly trauma, Geriatric, Traumatic brain injury

INTRODUCTION

According to the World Health Organization, traumatic brain injury (TBI) will lead as the major cause of death and disability by the year 2020.[1] In India, 6.63% of the total population above 60 years are considered as elderly in developing countries.[2] Injury mechanisms, patient characteristics, and biological sequelae of TBI among older adults are distinct from those of younger individuals and require a unique approach to clinical management and research. Epidemiologically, among older adults the most prevalent mechanism of injury is falls, and TBIs

occur more commonly in women, whereas for younger individuals most TBIs occur in men and due to motor vehicle accidents.[3-8] Biologically, with aging, white matter and vasculature become more susceptible to injury.[9,10] Injury response mechanisms such as autophagy are dampened, and prevalence of pre-existing neurological or systemic comorbidities increases.[11] Elderly with TBI experience higher morbidity and mortality and slower recovery trajectories and have, on average, worse functional, cognitive, and psychosocial outcomes months or years post-injury than do younger patients.[12-15] Consequently, there is often an assumption of futility surrounding the acute management of these patients. Some centres impose age cut-offs for even offering treatment, such as neurointensive care admission or neurosurgical intervention, for older adults presenting with severe TBI.[16,17] However, a subset of older adults with TBI, including severe TBI, may recover well, suggesting that chronological age and TBI severity alone are inadequate prognostic markers.[18-20]

Authors conducted a study of 110 cases of geriatric population who were admitted to these department with head injury either after fall or RTA in a span of 2 years to study the etipathogenesis and outcome of injury in such patients and the management strategies. .

METHODS

Inclusion criteria

Patients of head injury with age greater than 60 were included in these studies.

Exclusion criteria

All patients with age <60 years were excluded. Also, the patients who could not be revived and died in the casualty itself before admission to either the ICU or ward were excluded from the study. The time period of the study was a period of 2 years from January 2017 to January 2019. The study population was all elderly people (>= 60 years) who presented to these department of neurosurgery after a head injury.

Methodology was a prospective observational study conducted in the department of Neurosurgery, Dr. S.N Medical college and associated MDM hospital, Jodhpur Rajasthan India. The following information was obtained regarding age, sex, mechanism of injury, other associated injuries, Glasgow Coma Score (GCS) on admission, Computer Tomography (CT) finding, whether surgery was performed and Glasgow outcome score. Postoperatively patients that were conscious were extubated and transferred in a high care unit. Comatose patients were treated in the intensive care unit and had access to good quality of neurosurgical care.

The outcome of patients at one month post injury was assessed as a good recovery, moderate disability, severe disability, vegetative state or death according to the Glasgow outcome scale of Jennett and Bond.[21]

RESULTS

The age and sex distribution of 110 patients shown in (Figure 1). 68%(n=75) of the patients were male and 32% females (Figure 2).
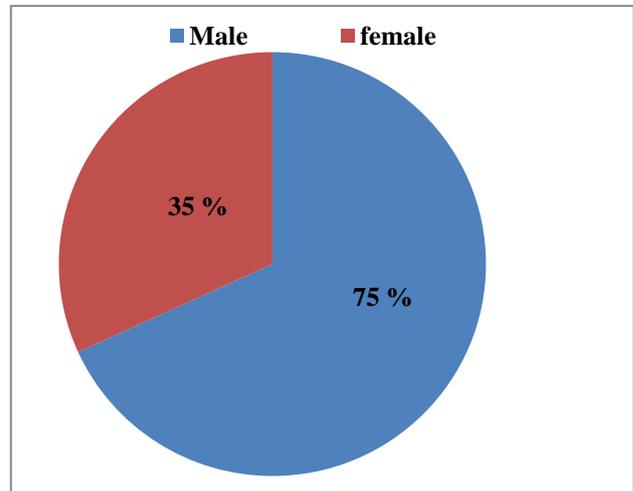

Figure 1: Sex ratio.

Patients in the age group of 60-65 years were 60.9%, 66-70 years were 20.9% and more than 70 years of age were 18.2%(Figure 2).
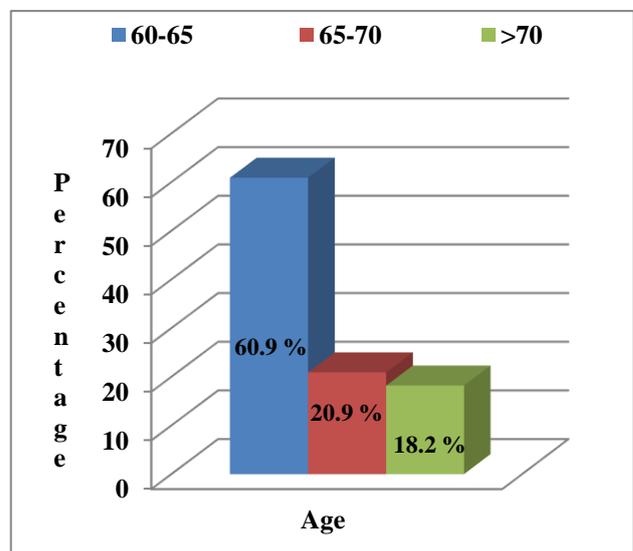

Figure 2: Age distribution.

About 50 % of these patients had some or the other co morbid condition such as Hypertension, Diabetes Mellitus, CAD, CKD etc. 36.36% of the patients presented with GCS in range of 13-15, 40.9 % in the range of 9-12 and 22.72 % with GCS of 8 and below (Figure 3). This corresponded with the mortality rates

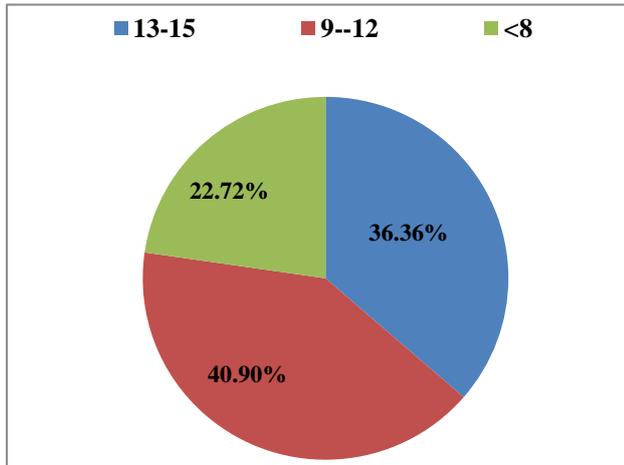with 68 % of the patients with GCS of 8 and less did not survive their injury.

Figure 3 : GCS score.

Overall mortality rate was 32.72% and 9.09 % of the patients survived in a vegetative condition. The mortality rate increased with age: the highest mortality was observed in patients aged above 70 years (50%). Mortality rates were 22.2% in patients with age group of 66-70 years, while it was 27.8% in patients with age group of 60-65 years (Figure 4).
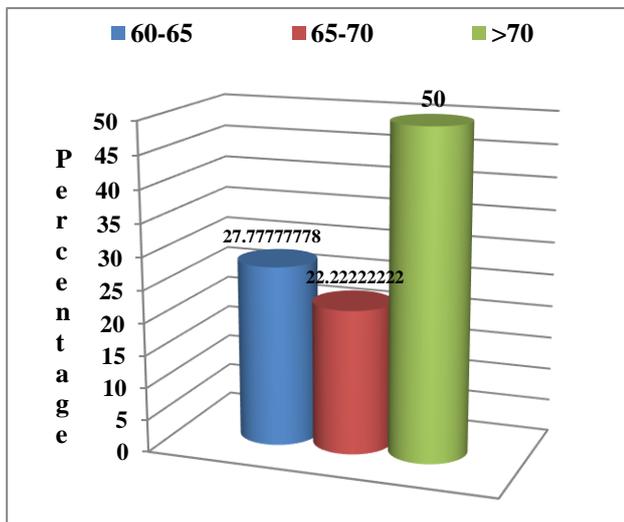

Figure 4: Age wise mortality rates.

Mortality rate was slightly higher in males (69.%) as compared to females (25%) in this study (Figure 5). The proportion of injury secondary to fall was the largest single group in 50.9% patients, road traffic accident in 45.45% patients while assault in 3.63% patients. (Figure 6). Chronic SDH was the most common pathology seen in 36.45 % patients and brainstem contusions being the least common seen in only 2.72 % patients. Acute SDH was seen in 16.36 % and Contusions were seen in 11.8% of patients. in 13.2% patients.
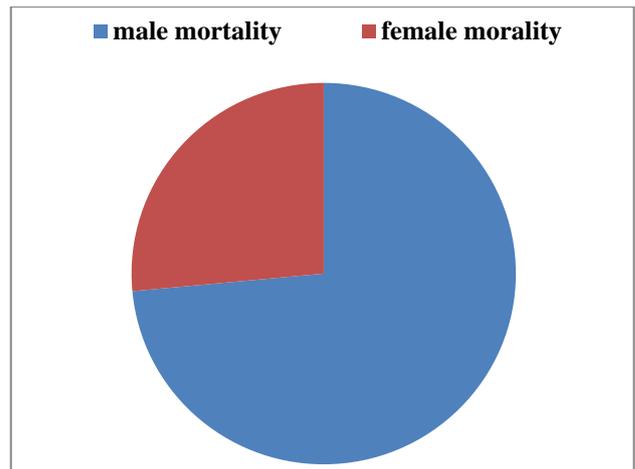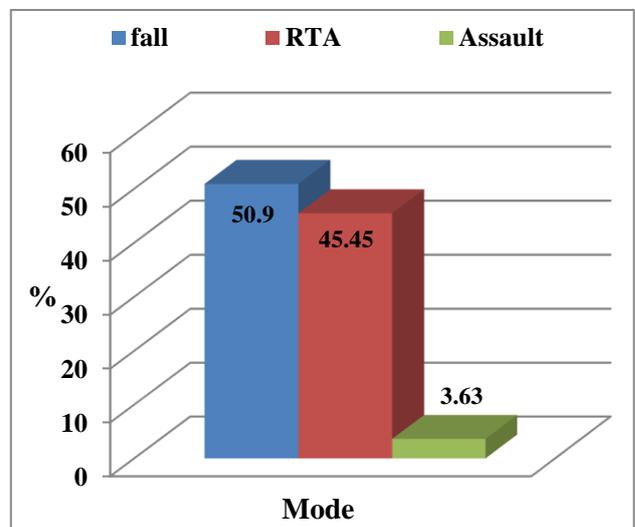

Figure 5: Sex wise mortality rates.
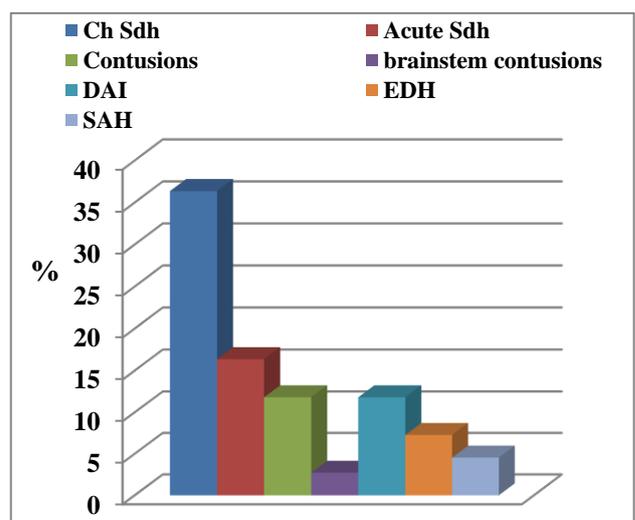

Figure 6: Mode of injury.

Figure 7: Various pathologies of traumatic brain injury.

Diffuse axonal injuries were seen in 11.81 % patients and EDH in 7.2% cases. 4.54% of the patients had SAH and 9.09 % had normal CT Scan head. (Figure 7)

Highest mortality was seen in patients with DAI group (69.23 %). Patients with brainstem contusions had mortality of 66.66 % . Acute SDH had mortality of 61.1%, Contusions had mortality of 61.53 %, and subarachnoid haemorrhage/intraventricular bleed 40 %. Chronic SDH had least mortality of 7.5 % and EDH also has less mortality of 12.5 %. (Figure 8)
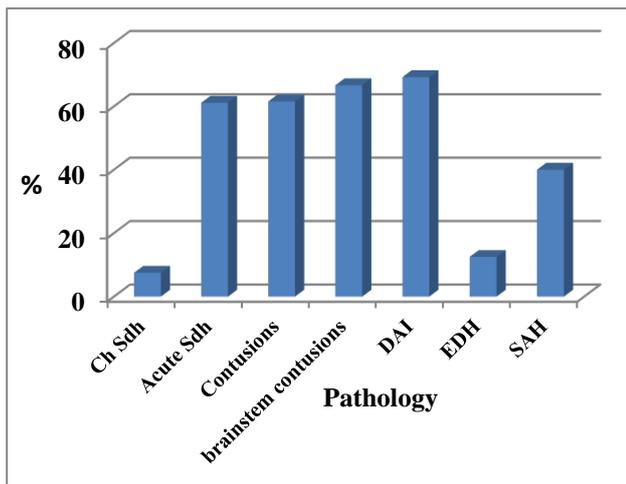

Figure 8 : Mortality rates of various pathologies.

Out of the 110 patients, 57 patients underwent surgery for various pathologies. EDH and chronic SDH were the most common operated pathology followed by chronic SDH (Figure 9). Both of these pathologies had a good outcome when compared to other pathologies such as Acute SDH and contusions.
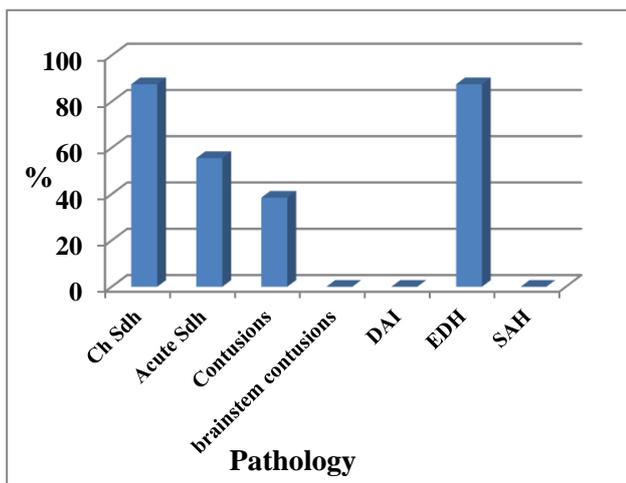

Figure 9 : Surgical rates in various pathologies.

Glasgow outcome scale was used as the measure of outcome in these series of patients. 32.72 % patients had a GOS score of 1 and 9.09 % had a score of 2. 18.18 %

patients remained severely disabled with a score of 3 and nine patients (8.18 %) had a score of 4 and thirty five patients had good recovery (GOS-5). (Figure 10)
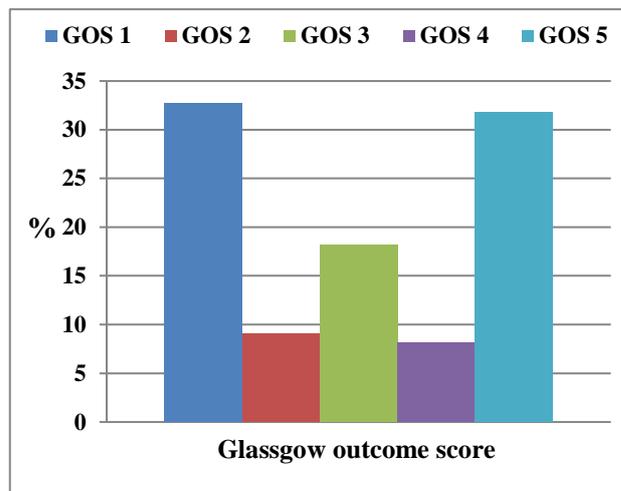

Figure 10: Outcome analysis with glasgow outcome score.

DISCUSSION

The most common mode of traumatic brain injury sustained by the elderly can be attributed to fall either from same level or low-levels.[22,23] In this study also falls were the most common mechanism of injury.

Mechanisms of injury are also important because of the pathology produced such as fall-related TBIs more commonly result in subdural hemorrhage and road traffic accidents resulting in diffuse axonal injury and acute EDH which is more commonly seen in young adults.[24] Also, alcohol abuse and drug abuse is less likely seen in eldery as compared to younger individuals with TBI.[4] Also, in the elderly associated co-morbidities such as cerebrovascular disease, depression, Diabetes mellitus are also associated with late-life incident TBI risk.[8]

In a study by Sinha et al, 68.2% were male and 31.74% were female and mortality on their series was highest in patients aged 70 years and above (28.6%) and 27% in patients with age group of 66-70 years.[25]

GCS is the most widely used tool for the clinical assessment to determine the severity of TBI at presentation. However, it may lack the nuance required to accurately assign TBI severity in older adults. Pre-existing dementia, comorbid conditions and medication side effects can confound the accurate GCS and patients may have an abnormal GCS at baseline.[26] However, the mortality rates are still very high in elderly with poor GCS as shown in a study where Mortality rates were as high as 90% for patients between 60 and 70 years who had GCS of 5 or less.[27] In these series 68 % of patients with GCS<8 also had high mortality rates of 68 %.

Plain CT head is the most common and important diagnostic tool in evaluation and management of head injury.[28-30] The types of pathologies seen on CT head differ by age: Prevalence of extradural hematoma declines with age whereas prevalence of subdural hematomas increases with age.[31] This was also observed in these series with 58 out of 110 patients presenting with SDH.

This dramatically higher prevalence among older patients is hypothesized to result from the following factors: age-related changes in vasculature and white matter rendering vessels more vulnerable to rupture and white matter tracts more susceptible to shear injury, weakened musculature in the neck and trunk; such that even ground-level falls are not well braced by the body, pre-existing conditions, and medications such as antithrombotics.[9,10,14]

The outcome of ICP monitoring in elderly is controversial, with some studies in favour andothers showing no major benefit.[32,33] Anticoagulant agents such as warfarin are associated with increased mortality, but such is not observed with antiplatelet agents especially when surgical imtervemtion is required.[34,35]

The risk of post-traumatic epilepsy is higher in elderly and also the risk of delayed seizures is greater than early seizures when compared to younger adults. Also, Pre-existing conditions such as Alzheimer's dementia (AD) can also increase the risk of epilepsy.[36,37] Newer antiepileptics such as lamotrigine or levetiracetam may be preferable to first line agents such as phenytoin due to its nonlinear kinetics.[38]

The GOS is the most widely used and widely cited functional outcome measures in TBI. The elderly with TBI on an average has slow rates of cognitive and functional recovery, worse functional outcomes and higher mortality rates when compared to their younger counterparts.[13-15,39] Also very old age and CT evidence of brainstem or diencephalic injury are associated with poorer outcomes. The mechanism of injury and GCS may be however less important predictors.[31,40] Careful patient selection, good pre-injury health status and and aggressive treatment for such pateints have been associated with lower short-term mortality among the elderly.[18,41,42]

There are no evidence-based national or international consensus guidelines and management guidelines for acute inpatient management or long-term outpatient follow-up of older adults with TBI. This is, in large part, attributed to the paucity of dedicated Class I prospective clinical trials of treatments for older adults withTBI.[16,17,43]

CONCLUSION

Due to the better treatment options there is an increase in the number of elderly around the world. Thus, the number of eldery individuals presenting with TBI to the emergency department is also on the rise more commonly due to falls than road traffic accidents. However, there are no specific prognostic and management guidelines for the elderly to differentiate the patients who would benefit from aggressive or conservative treatment and specific prognostic models so that prevention, treatment and rehabilitation can be optimized. This can only lead to better diagnosis, care and recovery and eventual better short- and long-term outcomes in the elderly.

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