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Geriatric head injuries - Experience and expectations

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Abstract: It is widely known that global citizenry is continuing to age. The elderly head trauma patients, comprising 4.83% in our series are important from neurosurgical aspects. We conducted a study of elderly head injury patients admitted to our unit in last 11 years. Out of 620 patients, 423 males and 197 female, constituting a ratio of 2.1:1. Fall constitutes the principle mode of injury (56.29%) followed by RTA (44.1%). We analyzed all the cases for surgical intervention after careful assessment of neurological condition. Amongst all cases operated for acute trauma, good recovery was seen in 51.8% and mortality in 41.7%, whereas in chronic subdural haematoma 84.2% cases showed good recovery as against mortality in 10.5%. In our society, due to very close family ties and desperation of family members to try active intervention even in patients with expected bleak outcome, we operated a fairly large number of cases and concluded that outcome was better after operative intervention.

Keywords : aged population, elderly trauma, geriatric, head injury, outcome

INTRODUCTION

There is a significant increase in geriatric population at global level and at present constitute approximately 15% of the population of developed countries like U.K[1]. It is projected that by 2030, the world will have a million centenarians[1].

In India, 6.63% of the total population above 60 years is considered elderly as described in developing countries[2].

Elderly trauma patients present unique challenges and face more significant obstacles to recovery than their younger counterparts[3]. The effect of head injury is disproportionately severe in elderly and for a given severity of head injury, more patients require admissions and neurosurgical care[4]. We are presenting a study of 620 cases admitted and treated in our unit in the past 11 years.

MATERIAL AND METHODS

We had 845 patients of head-injury aged 60 and above admitted from January 1997 to Dec. 2007(a period of 11 years). Complete record was available for 620 patients and 46 patients absconded from the ward or left and were without follow-up after admission.

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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 criteria of Jennett and Bond[5].

RESULT

The age and sex distribution of 620 patients shown in (Fig 1). 68.2% of the patients were male and females were 31.7% with male: female ratio 2.15:1. Patients in the age group of 60-65 years were 58.7%, 66-70 years were18.8% and more than 70 years of age were 23.2%(Fig 1).

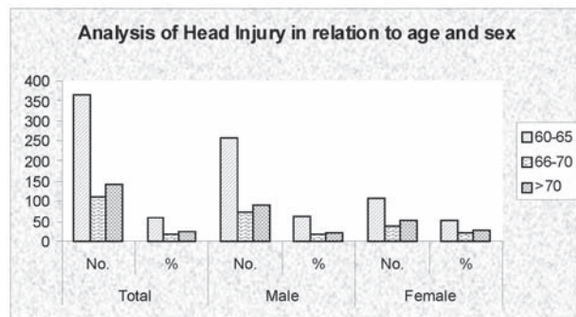

Fig 1

Overall mortality rate was 25.6% and 5.1% 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 (28.6%). Mortality rate was 27% in patients with age group of 66-70 years, while it was 24% in patients with age group of 60-65 years (Fig 2).

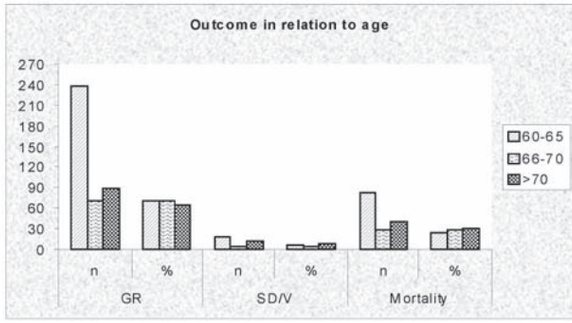

Fig 2

Mortality rate was higher in females (29.3%) as compared to males (23.9%) in this study (Fig 3).

Fig 3

Injury mechanism of 620 patients showed in Fig 4. The proportion of injury secondary to fall was the largest single group in 56.3% patients, road traffic accident in 44.1% patients while assault in 8.7% patients. Outcome in relation to mode of injury (574 patients) mortality was highest in patients with road traffic accidents 27.5%, in comparison to fall where mortality was 24%. In the cases of assault, mortality rate was 23.5% (Fig 4).

44% of the patients had initial GCS between 13-15 on admission, 25.9% patients 9-12 while 30% patients had GCS 8 or below on admission. Highest mortality 67.8% was seen in patients with GCS of 8 or below and mortality was 15.8% in patients with GCS 9-12.

Chronic subdural haematoma was the most common intracranial pathology found in 20% of the patients.

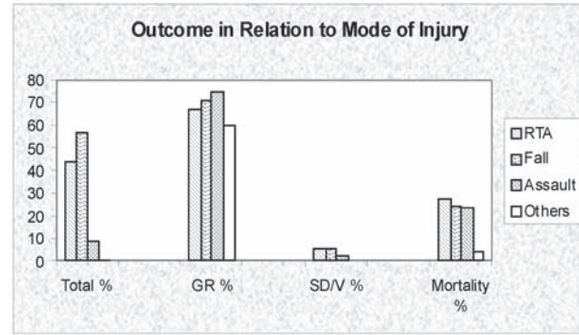

Fig 4

Contusions seen in 19.3% and multiple intracranial haematoma in 13.2% patients, Brain stem contusions and diffuse axonal injuries in 4.2% patients and EDH in 3.5% cases. 25.7% of the patients had normal CT Scan head. Highest mortality was seen in patients with brainstem contusion/DAI group (66.6%). Patients with multiple intracranial haematoma had mortality 47.5%, patients with contusions 40%, and subarachnoid haemorrhage/intraventricular bleed 25%. CT Scan was not performed in 33 patients who were very critical and expired (Fig 5).

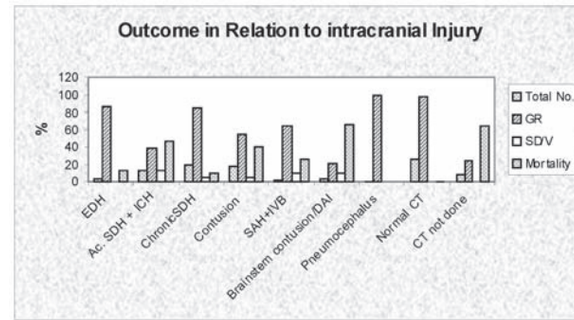

Fig 5

DISCUSSION

Geriatric head injuries present unique complex challenges and response hence need evaluation of management regime.

In our study, 68.2% were male and 31.74% were female. The male: female ratio was 2.19:1 attributed to more outdoor exposure of males and hence vulnerability to fall and accident. Jamjoon et al[6] reported no significant difference to outcome with respect to sex but significantly poor outcome in the older patients of head injury. Mortality was highest in patients aged 70 years and above (28.6%) and 27% in patients with age group of 66-70 years. The main problem for elderly patients with head

injury is that they have a reduced cerebral reserve and less ability to withstand even a minor injury.

The presence of peripheral orthopaedic fracture unlike skull fracture did not influence the outcome. Fracture affecting limb, ribs, pelvis occurred in 1.7% cases. Major extracranial injuries, when they are multiple and results in hypotension, hypoxia are associated with a poor prognosis[6].

In our series, long bone injuries, was seen in 26, chest injuries in 17, facial injuries in 10, abdominal injury in 8 and spinal injury in 5 cases. Eighty five percent of our patients with chest and abdominal injuries expired.

It has been observed that around 50% of elderly patients carried pre-existing disease, which is increased to 70% in patients over 70 years of age[7]. In our study, 40% of the elderly population had pre-existing disease. Injury is more often due to a fall and less often due to RTA and assault. Many older people have pre-existing medical condition, like diabetes, arrhythmias, neuropathies, osteoporosis etc., that of themselves or a consequence of their treatment, predispose the older patients to a fall. Staircases are particularly hazardous for these patients[4,8]. Jamjoom et al[6] reported fall accounted for 73% cases of elderly head injury and alcohol was contributing factor in 15% cases. Fall is one of the leading cause of traumatic brain injury (TBI) of older patients (51%) and motor vehicle traffic accident are second (9%)[9]. In our series, fall accounts for head injury in 56.3% cases, RTA in 44% cases and assault in 7% cases. Alcohol was not a significant contributing factor in our study.

Road traffic accidents accounts for a high proportion of the most serious head injuries amongst the elderly[6], as in our series mortality rate was 27.5% in cases of RTA, 24% in cases of fall while it was 23.5% in assault.

Mortality after minor head injury in patients of 80 or above was 12%, which is seven times greater than young patients[8]. Patients over 70 years who had sustained most minor of head injuries with a GCS of 15 had a less than 50% of chances of returning home and such patients virtually never returned to their pre-accidental status[10].

Patients over 70 years with initial GCS 8 or less had a mortality of 85%. This rose to virtually 100% if there was associated intracranial bleeding[11]. This has been confirmed by Miller[12]. Fewer than 5% of patients of 65 and above who remained in coma for more than 6 hours recovered to the level of good outcome or moderate disability on the Glasgow outcome Scale[13]. Mortality was 90% for patients between 60 and 70 years who had GCS of 5 or less. The same mortality was present if the GCS was 6 or less between 70 to 80 years, 8 or less between 80 to 90 years[10]. Levati et al[14] reported mortality of 100% in head injury patients with GCS less than 5 in patients of age 60 years and above. A mortality of 87% in elderly patients with traumatic intracranial haematoma and pre-operative GCS less than 8[15].

In this study, mortality was 67.8% in patients with GCS 8 or less then 8. 15.8% in-patient, with GCS 9-12 and 2.1% mortality with GCS 13-15. Overall mortality was 25.8%.

Unilateral pupillary dilatation and non-reactivity to light carry a mortality rate of between 54-70%. In patients with bilateral non-reactive pupil the mortality rate was more than 80%[16,17]. Jamjoom et al reported unilateral non-reactive pupil carried a mortality of 93% and bilateral non-reactive pupil mortality of 100%. In our study, elderly patients with unilateral pupillary dilatation carried a mortality of 90% and bilateral non-reactive pupil mortality of 100%[6].

The pathological consequences of elderly head injury as a result of minor head trauma is chronic SDH, which is predominant, being 20% in our study.

Apart from chronic subdural haematoma however a head injury is much more likely to give rise to intracranial bleeding or a cerebral contusion in an elderly. One exception to this rule is extradural hemorrhage which is relatively rare in elderly, probably because the dura becomes more adherent to the inner table of the skull with increasing age[1,8,10]. In our study, EDH occurred in 3.5% of the patients.

The incidence of a traumatic intracranial hemorrhage after a head injury was 9.4% in those of above 65 years in comparison to 4% below this age group[18]. Twenty nine percent of the head injury patients over the age of 80 years developed intracranial bleeding, and even amongst those with mild head injury (GCS 13 to 15) 19% developed intracranial bleeding[8]. In our study, 19.2% patients had contusions and multiple traumatic intracranial hematoma seen in 13.2% cases. There are several reason for Intracerebral bleeding[4,8], including use of anticoagulants, greater degenerative fragility of cerebral vessels and stretching of bridging vessels caused by cerebral atrophy and sensitivity to ischemia. Elderly

population had SDH 4 times larger than young population and mass effect is twice as in the young patients.

The prognosis is especially bad if traumatic intracerebral hemorrhage is superimposed on a coma producing head injury[4]. Mortality was 79% in elderly patients of acute SDH[8]. In this study, 25.7% patients had normal CT Scan with mortality of 1.49%. Patients with brainstem contusion / DAI had mortality of 66.6%, multiple Intracerebral hematoma 47.5%, contusion 40%, SAH/IVB, EDH13.6% and chronic SDH 9.7%. In 20 patients CT Scan could not be done because of very poor general condition.

MANAGEMENT

Elderly trauma patients have been found to benefit from aggressive resuscitation and intensive care management. The poor physiological reserve in these patients require invasive hemodynamic monitoring in an attempt to optimize resuscitation efforts.

All patients received aggressive resuscitation and neurosurgical care, however they may have succeeded in increasing the number of patients with severe disability and mortality rate remained high in elderly head injury[8]. There is little benefit by active treatment like prolonged hyperventilation, barbiturate coma in severe head injury[4].

Despite over all high mortality, longer length of stay, increased resources used and higher rate of discharge to rehabilitation, most elderly trauma patient return to independent or pre-injury status[3]. Criteria to improving outcome is an understanding that similar trauma principles apply to the elderly, and these patients require more aggressive evaluation and resuscitation[3].

The anesthetic management of surgery for the elderly trauma victim is more complicated than in young adults. Evaluation of the physiologic status of the geriatric patient should take into account the changes associated with advance age. Care of the injured elderly patient requires through pre-operative assessment and planning and involvement of a multidisciplinary clinical team approach in the management of the elderly surgical patient[19]. Surgical indications in elderly include GCS of 8 or more prior to surgery, no pupillary dilatation, patients over the age of 75 years[6] but in all cases surface haematoma should be evacuated.

We analyzed all the cases for surgical intervention after careful assessment of neurological condition. CT Scan finding of large haematoma, mass effect, shift or effacement of cisterns and ventricles, poor or rapidly deteriorating neurological status and GCS. All surface hematomas were evacuated. In severe head injuries, the surgical decision was based on indications and relative's desire after explaining the expected outcome. In our study, surgery was performed in 36.9% cases and mortality in operated cases was 29.2%.

Overall outcome following Craniotomy in elderly head injury excluding chronic SDH was 41.4% died, 7% were in persistent vegetative state or in a state of severe disability, while 51.5% survived with moderate disability and good recovery. The outcome was worse if surgery was carried out with in 24 hours of the head injury and uniformly bad if GCS had fallen to 4 or less and if there is any pupillary dilatation before surgery.[6]

Patients over 70 years who has a combination of GCS 8 or less with traumatic intracerebral haematoma died despite of aggressive treatment. Kotwica et al advised surgery should be considered only if it was conscious on admission[11]. Patients over 65 years who underwent craniotomy for traumatic intracranial haematoma are those with GCS 13-15, 55% died at 6 months, while 16% were left severely disabled, 3% with moderate disability and 24% made good recovery. In our series, patients of chronic SDH had high recurrence rate because of advancing age, bleeding tendencies, alcohol abuse, brain atrophy, post-operative subdural collection, haematoma density, some technical aspects of surgery. The main problem for elderly patients with head injury is that they have reduced cerebral reserve and are less able to withstand even a minor injury. Brain damage from minor injury when added to pre-existing impairment like dementia may lead to cognitive defects severe enough to preclude discharge or independent living.

CONCLUSION

Result of advances in radio-imaging, surgical technique, anesthesia and ICU care are responsible for better results in geriatric head injury. Surgery should be done if radioimaging showing space occupying lesion with mass effect and clinical correlation. Effort should be focused on management and prevention of complications in geriatric trauma patient. A multidisciplinary approach is required for management and to minimize secondary complications

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