

Out come in Head Injured patients : Experience at a level 1 Trauma Centre

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Abstract: Traumatic brain injury (TBI) is the leading cause of death. Evidence-based guidelines for TBI care have been widely discussed, but in-hospital treatment of these patients has been highly variable. We carried out this study to evaluate outcome in patients with head injuries in relation to post-resuscitation GCS score, at a Level 1 trauma centre. A secondary objective was to look for epidemiological factors responsible for these head injuries. In this retro-prospective study, all patients with head injury who were admitted in the department of neurosurgery at JPNATC in last 15 months period were enrolled. Post-resuscitation GCS was considered as baseline and outcome was assessed at discharge using GOS. All patients were managed as per laid down departmental protocols. Total 2068 patients of head injury were enrolled during the study period. Age ranged from 1 - 80 yrs, 71.4% was male and 28.6% were female. The most commonly involved age group was 20-40 yrs (43%) and the most common mode of injury was road traffic accidents (64%). 53% of the patients had severe head injury (GCS d"8), 18% had moderate head injury (GCS 9 to d"13) and 29% had minor head injuries (GCS e"14). 17 patients had penetrating head injury, and 13% had compound head injury. The mean hospital stay was 14 days (range 1 - 62 days). Overall in-hospital mortality was 22% (454 cases), of these 38% were children. Amongst all, 2% of minor head injury, 12% of moderate head injured and 36% of severely head injured patients were expired; 28% of compound and 29% of penetrating injury patients died. Of the patients who expired, 39% died within 48 hrs of injury. Amongst those who survived, 28% had good outcome and 19% remained in vegetative state. Our outcome rates for head injured patients compare favorably with international data. This is the first study of its kind from India, which shows mortality rates and outcome in patients with head injuries.

Keywords: head injury, mortality

INTRODUCTION

Worldwide, traumatic brain injury (TBI) is the single largest cause of death and disability following injury. Most TBI's are due to roadside accidents. According to WHO data, by the year 2020, head trauma will be third largest killer in the developing world. The statistics from India are even more alarming. Studies by traffic police have shown that on an average one person dies every six min, 70% of these being directly attributable to head and spinal trauma. The annual social costs of road accidents are estimated at Rs. 55,000 crores (3% of India's GDP). The accident rate of 35 per 1000 vehicles in India is also amongst the highest in the world. In this study we attempted to evaluate outcome in patients of head injuries in relation to post-resuscitation GCS and GOS. A secondary objective of this study was to look for associated epidemiological factors.

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Manuscript for consideration for best paper award at the

18th National Neurotrauma Conference, held at Jaipur, 7-9 Aug 2009

MATERIAL AND METHODS

In this retro-prospective study, all patients with head injury who were admitted in the department of neurosurgery at JPNATC in last 18 months period were enrolled. Post-resuscitation GCS was considered as baseline and outcome was assessed at discharge using GOS. All patients were managed as per laid down departmental protocols. Poly-trauma patients admitted under other departments and patients managed through OPD / kept under observation in the emergency department were excluded from study. Based on the Glasgow coma score (GCS) patients were grouped as minor head injury (GCS 13-15), moderate head injury (GCS 9-12) and severe head injury (GCS 8 or less); No surgical intervention done for patient with GCS 3-5 with fixed dilated pupil and /or BP<90 mm Hg.

Statistical correlation was done using Chi square / Fischer exact test (WHO software "EPIINFO version 6.04D).

RESULTS

Total 2068 patients of head injury were enrolled during the study period. The overall series was comprised of

age group in the range from 1- 85 yrs years with mean of 24 years. There were 305 patients of below the age of 10 years and most commonly affected age group was in the range 21 - 40 yrs (41%). 71.5% were males and the remaining 28.5% were females. Most common mode of injury was from road traffic accidents (64%) and assault (26%). Hospital arrival time was from 3 hrs to 4 days since injury and the time of injury for most of the patients were from 6pm–3am (59%) vs 3am–6pm (41%). Minor, moderate and severe head injury patients comprised of 598, 380 and 1090 nos, respectively. There were 17 patients of penetrating head injury in the series, in which the entry site were occipital (41%), frontal (20%), temporal (23%), parietal (23%). 286 (13%) sustained compound head injury. 28% (226/782) patients had good outcome and another 19% (156/782) remained in vegetative state (Table 1).

Another interesting finding was that in patients with severe head injury, surgical intervention had a statistically better outcome compared to those who were not operated (Table 2).

Hospital stay ranged from 1- 62 (14 ± 2) days. The overall mortality was 22% (454/2068) during the in hospital stay. The mortality was 2% in patients with minor head injuries, 12% in patients with moderate head injuries and 36% in severe head injuries (Table 3).

Table 1: Overall outcome in patients with head injury

Glasgow Outcome Score	No. (%)
1 Death	454 / 2062 (22%)
2 Vegetative	156/782(19%)
3 Severe disabled	103/782 (13%)
4 Mod. disabled	139/782 (17%)
5 Good recovery	226/782 (28%)

Table 2: Outcome in patients with mild, moderate and severe head injury. As can be seen patients with severe head injury who were operated had a significantly better outcome than those who were not operated.

Mode of treatment	Admission GCS score	Survived	Died	P value
Surgery	3-8	617	192	<0.05
Conservative	3-8	78	203	
Surgery	9-12	109	18	
Conservative	9-12	226	27	
Surgery	13-15	23	2	
Conservative	13-15	561	12	

Mortality was higher in the extremes of age. Children less than 10 yrs had 38% mortality and elderly (>50 yrs) carried 37% mortality rates following head injury (Table 4).

DISCUSSION

Incidence as well as severity of head injuries is rising all over the world due to rapid industrialization and more rapid methods of transport. There is loss of intellectual & other faculties with a resulting burden on family & the society. Burden is even more serious as majority of the head injury victims belong to young & productive age group. The Glasgow Coma Scale (GCS), first introduced in 1974, is one of the most important predictors of outcome after head injury¹. Glasgow Outcome Scale (GOS) was first used in 1975 to assess outcome after severe brain damage and is widely accepted as a standard means of describing the sequelae of traumatic brain injury. Using GOS, outcomes are classified as good recovery -1, moderate disability -2, severe disability -3, persistent vegetative state -4, and death-5. The GCS and GOS are closely related scales on which a patient's condition is rapidly assessable¹⁻⁶.

There has been a worldwide increase in the incidence of head injuries. Kagan RJ et al found that mortality rates were between 26.7% to 41.4% for head injured

Table 3: In-hospital mortality in patients with head injury

Group	In-hospital Mortality (No)	Total Cases	%
Overall	454	2068	22
Minor HI	14	598	2
Moderate HI	45	380	12
Severe HI	395	1090	36
Compound HI	81	286	28
Closed HI	368	1732	21
Penetrating HI	5	17	29

Table 4: Comparison with literature of current study regarding outcome after mild, moderate and severe head injuries

Author Series	Mortality		Moderate	Severe
	Overall	Minor		
Kagan RJ 1994	26.7%	0	0	41.4%
Fakhry SM 2004	28.8%	0	0	0
Udekwa P 2004	21%	0	0	31.5%
Present study	22%	2%	12%	36%

patients in Level 1 trauma centers⁵. Fakhry et al in their study found 28.8% mortality rate of severely head injured patients⁶. The present study has an overall mortality of 22% and the mortality is 36% for severely head injured patients, which is comparable to other studies (Table 4).

We compared various age transformations to identify simple and accurate descriptions of the associations between age and mortality in patients with TBI. We found that these associations were continuous. In accordance with data from several other studies, we observed that the proportion of survivors with poor outcomes (for example, severe disability or vegetative state) increased with age and that the proportion of patients with favorable outcomes declined. These results support the hypothesis that the adult brain has a decreased capacity for repair as it ages, because of a decreasing number of functioning neurons and a greater exposure to minor repetitive (often subclinical) insults to the brain as age increases. In adults, however, diminished cognitive or behavioral function may be influenced beneficially by regeneration or plasticity of the brain⁵. Further investigation of the physiological and pathophysiological features in the aging brain is required to identify new medical interventions that perhaps could prevent the poorer outcome associated with advanced age.

CONCLUSION

Post resuscitation GCS prognosticated outcome in the present study. Our mortality rates for head injured patients compare very favorably with international data. This is the first study of its kind from India, which shows mortality rates and outcome in patients with head injuries.

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