

Factors Influencing Outcome of Head Injury Patients at A Tertiary Care Teaching Hospital in India

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Abstract:

Background: Trauma is the most common cause of morbidity and mortality in people younger than 45 years and head injury is mostly highly weighted predictor of outcome in trauma population, anything that can improve the outcome from severe head injury has the potential of improving the lives of many accident victims.

Objective: A study regarding factors influencing outcome of traumatic brain injury patients was conducted at a tertiary care hospital of Srinagar (India). The basic predictors in this study included age, sex, rural/urban, time taken from site of trauma to arrival at hospital, mode of transportation, referral from other hospitals, referral to other hospitals, and Glasgow Coma Scale.

Methods: Traumatic Brain Injury (TBI) patients (n 547) were taken prospectively by simple random sampling method for a period of one year (2004) for this study.

Results: Majority of patients belonged to age group 0 to 10 years (25.5%) and a maximum death (8) were seen in age group 51 to 60 years. Maximum number of patients were males (75.9%) and (71.1%) TBI patients were from rural areas. (26.7%) reached this hospital within a period of one hour. (66%) were shifted through ambulance service. 6.4% expired after treatment.

Conclusion: Factors responsible for improved outcome in severe head injury patients are improvement in early recognition, resuscitation and triage, coupled with prompt computed tomography (CT) scanning and aggressive surgical management.

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Introduction

Traumatic brain injury is leading cause of death and disability worldwide. Every year about 1.5 million affected people die and several millions receive emergency treatment. ⁽¹⁾

Head injury is recognized as a major public health problem that is frequent cause of death and disability in young people and makes considerable demand on health services. ⁽²⁾ The quality of survival after severe and moderate head injury is highly dependent on the adequacy of cognitive recovery. Outcome assessments are usually based on the integrity of neurological function and give little information regarding cognitive abilities. ⁽³⁾ The mortality of children's caused by trauma and head injury is second only to congenital disease in developed countries. ⁽⁴⁾ Since 1970's Glasgow coma scale (GSC) and computed tomography (CT) scanning has been used in evaluating head injury patients. ⁽⁵⁾ Trauma presents with variety of injuries and problems that demand rapid evaluation, discussion, improvisation and intervention to save life and prevent permanent disability. ⁽⁶⁾ The purpose of this study was identify risk factors associated with TBI.

Methods

Data was obtained from Accident and Emergency Department of Sheri-i-Kashmir Institute of Medical Sciences, Srinagar for 547 patients sustaining TBI between January to December 2004, by simple random sampling method. The Sheri-i-Kashmir Institute of Medical Sciences caters whole population of Kashmir and patients are also referred from Jammu and Ladakh. Patients selected for analysis included all age group, both sexes admitted in Accident and Emergency department, for a period of one year. The patients were followed from admission, up to discharge, to describe and identify risk factors associated with TBI. A Questionnaire was developed and data was collected under following

headings, Age in years, sex, rural / urban, time taken from site of trauma to arrival at hospital, mode of transportation, referral from other hospitals, outcome of treatment and referral to other hospitals.

Observations

Age

The age of patient varied from six month to 80 years. Majority belonged to age group of 0 - 10 years followed by age group of 21 - 30 years. The age distribution is given in Table (1).

Table (1). Hospital admissions according to age of patients (n =547).

Age in years	TBI Patients percentage	No. of deaths
0- 10	25.5	4
11-20	15.5	3
21-30	21.2	3
31-40	10.2	7
41-50	07.1	6
51-60	07.8	8
61-70	03.0	2
71-80	1.7	2

Gender

Majority of patients were males. The male / female ratio is 3: 1. There were 75.9 % males and 24.1% females. Total deaths were 35 (24(4.4%) males and 11(2%) females).

Geographical distribution

Most patient of head injury was from rural areas (71.1%) out of which 26(4.38%) died as compared to 28.9% urbanites out of which 9(1.66%) died.

Time taken from the site of trauma to arrival of patients to this tertiary care Institute was highest in (1hour to < than 2hours). Also referred patient from peripheral health services was 80.5% patients. The patients admitted in Accident and Emergency department had not received any first aid at the site of trauma. Mode of transportation out of total number of 547 patients was 66% by ambulances. 6.4% patient was referred to other hospitals for management of associated injuries and 6.4 % patients expired after treatment (Table 2)

Table (2). Number and percentage of patients of TBIs and deaths by time taken from site of trauma to arrival at hospital, mode of transportation, referral from, referral to other hospitals and outcome at a tertiary care hospital.

Time taken	Number of patients												Total	% age	Total Expired
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec			
< 1hr	3	9	14	11	18	16	18	12	12	10	11	12	146	26.7%	4
1-2hrs	6	7	7	6	10	8	7	7	8	4	5	4	79	14.4%	4
2-3hrs	9	4	6	5	9	7	8	5	6	3	6	5	73	13.4%	5
3- 4hrs	3	5	6	5	8	7	7	6	6	5	7	6	71	13%	6
4-5hrs	2	4	4	3	5	4	4	4	4	3	5	4	46	8.4%	7
>5hrs	3	8	18	12	14	17	15	8	11	10	6	10	132	24.1%	9
Mode of transportation															
Ambulance	16	27	40	30	40	30	35	30	32	25	28	29	362	66%	24
Private transport	10	10	15	12	24	29	24	12	15	10	12	12	185	34%	11
Referral from															
Associated Hospital	6	9	13	9	12	9	10	7	9	6	8	9	107	19.5%	10
PHS	20	28	42	33	52	50	49	35	38	29	32	32	440	80.5%	25
Referral to other Hospitals	2	3	3	2	4	3	3	3	4	2	3	3	35	6.4%	-
Expired	1	2	2	3	4	4	4	3	4	3	3	2	35	6.4%	-

PHS Peripheral Health Services

Glasgow Coma Scale (GCS) Score

At the time of admission majority of the patient were conscious and having GCS of 15 which is shown in Table (3).

Table (3). Glasgow Coma Scale (GCS) Score.

GCS score	No. of patients	Improved	Expired
15	439	439	-
13-14	54	51	3
8-12	29	22	7
< 8	25	-	25
	547	512	35

Discussion

Sher-i- Kashmir Institute of Medical Sciences is the only tertiary care hospital in Kashmir province where Neurosurgical facility is available. This study of traumatic brain injury shows that all age groups were affected with maximum patients in the age group of 0 - 10years (25.5%) and 75.9% were males. This is in consistence with the finding seen in Kennedy et al in their series 192 patients which showed 90% were 0 - 40% old⁽⁷⁾ and Adam NM et al (1996) in their series of 672 patients showed 533 were male and 139 female patients.⁽⁸⁾

Our study showed higher rates of TBIs in rural areas (71.1%) than in urban areas (28.9%). This is in consistence with the findings of Gabella B, et al⁽⁹⁾ used a state surveillance system to identify cases of TBI for the year 1991 and 1992. This study showed higher rates of severe traumatic brain injury in rural as compared to urban areas.

Since 1978 GCS Scale has been used to assess the seriousness of head injury that the criteria used by international Data Bank (total of GCS score of 8 or less for 6 hours) be used to set the boundaries of patients study groups, and that GSC score outcome be used as the initial end point at a specified time from injury for measuring morbidity and mortality. Old age, low GCS score and presence of major extra cranial injury predict poor prognosis. Glasgow coma score showed clear linear relations with mortality. In the present study 80.2% patients were having GCS of 15 and 4.6% were having GCS < than 8⁽¹⁰⁾

Perel et al in his study regarding outcome of the traumatic brain injury observed that practical prognostic models based on large cohort of international patients showed that more of patients were

men (81%) and more than half (58%) of patient were admitted within three hours of injury. The relation between age and log odds of deaths within 14 days showed no association until age of 40 and linear increase after wards.⁽¹⁾ In this study time taken from the site of trauma to the arrival at hospital was less than 3 hours in 41.1% patients. Mode of transportation was (66%) by ambulance services and (34%) by private transport .24(4.4%) died who came via ambulances services and 11(2%) died who came via public transport indicating that ambulances services of the state are poorly equipped. Referred patients from peripheral health services were 81% and Associated Hospitals of Government Medical College Srinagar (19%).Referral to other hospitals from this tertiary care hospital for further management of associated injury like fractured bones was 6.4%. Julie L, et al in their study published in MM WR (December 06, 2002) reveals that during 1989-1998 an annual average of 53, 288 deaths among the USA residents were associated with TBI for a rate of 20.6 per 100,000 populations.⁽¹¹⁾ In our study average TBI deaths is 6.4%.

Since SKIMS is the only tertiary care hospitals of Kashmir where all TBI patients are being treated its services need to be upgraded or a separate Advanced Trauma Centre with neurosurgical facility having its own ICU nursing staff & neuroanaesthesia to provide prompt and quality treatment to all TBI patients may be established. Ambulance service of Kashmir valley needs to be properly organized to have all the life saving facility to treat emergency patients as well as TBI patients on time. Trauma services need to be started at district and sub-district level to treat all trauma patients, as well as TBI patients without any delay. Referral system in Peripheral Health System need to be improved so that only critically ill patients will be referred to tertiary care center, in time for better management and outcome.

Conclusion

This study reveals that the head injury is one of the major health problems in Kashmir. The age of head injury patients varied from 6 months to 80 years and the maximum number of patients (25.5%) was found in the first decade of life. SKIMS are the only place for management of

traumatic brain injury and patients are referred here from all over the state, particularly from rural areas. In spite of inadequate first aid at the site of injury, delays in transportation, lack of awareness, poor referral system, many lives are saved and morbidity minimized after providing prompt and quality treatment at this premier medical centre.

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