

Outcome of pediatric head injury patients admitted as unknown at a level-i apex trauma centre

Haradhan Deb Nath, Vivek Tandon¹, Ashok Kumar Mahapatra², Deepak Kumar Gupta

Departments of Neurosurgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, ¹All India Institute of Medical Science, New Delhi, ²All India Institute of Medical Science, Bhubaneswar, Odisha, India

ABSTRACT

Objective: Patients with head injury who are not identified at admission are a challenge to manage and in this backdrop we decided to analyze our data of such pediatric patients for their outcome.

Materials and Methods: It was a retrospective study conducted at the level-I trauma center. A total of 12 consecutive pediatric (<20 years) age group patients whose identities were not known at the time of admission were included in the study.

Results: All 12 patients were male. The road traffic accident was the most common cause of injury (8, 67%). Mean age of the patients were 16.75 ± 4.45 years. Computerized tomography (CT) scan showed cerebral contusion in four (33%) patients. Six (50%) patients needed surgery and others were treated conservatively. During the course of hospital treatment, one (8%) patient died, two (16%) had good recovery, and four (33%) were moderately disabled. Among the 12 patients identity, eight (67%) could be ascertained. Seven (58%) patients were sent home with their relatives, one (8%) was referred to a district hospital and three (25%) remained as unknown and were referred to destitute home for rehabilitation.

Conclusion: Unidentified patients of pediatric age group have better outcome if proper care is provided in time.

Key words: Computerized tomography, glasgow coma scale, head injury, intensive care unit

Introduction

Head injury is more frequent in young people in the age group of 20-40 years. Around 60-70% head injury occurs in the 3rd or 4th decade of life. In India, 40% population belongs to pediatric age group and around 25-27% of all head injury victims are children under 16 years of age.^[1,2] A study from USA reported peak incidence of head injury in the 3rd decade and rate of head injury ranged from 300-600/100,000 population. Not surprisingly, the incidence of head injury is lowest in extremes of age, that is, below 5 years and

above 60 years; and the rate is around 125-150/100,000 population.^[3]

Traumatic brain injury (TBI) is responsible for nearly 2 million emergency department admissions in the United States, affecting 2% of the population per year. Approximately 250,000 of these patients require hospitalization; nearly 50% of those admitted will undergo surgical evacuation of a hematoma.^[4] Mortality is 20%, another 35% have significant long-term neurologic deficits.^[5] Such demographic data is being utilized to define evidence-based guidelines for management of head injury patients. All these studies have higher number of patients in adult age group and compared to this, data for pediatric head injury patients is very less. With the International Data Bank and the Traumatic Coma Data Bank (TCDB) representing significant efforts to define the assessment of coma as well as identify the critical variable that can affect outcome.^[6,7] Attempts to systematize care of patients with severe TBI have culminated in evidence-based guidelines issued by the joint task force between the Brain Trauma Foundation and the American Association of Neurological Surgeons.^[8,9] In this retrospective study, we analyzed data pertaining to pediatric patients whose identities could not be ascertained at the time of head injury. This subgroup of patients presents unique

Access this article online	
Quick Response Code:	Website: www.asianjns.org
	DOI: 10.4103/1793-5482.161183

Address for correspondence:

Prof. Ashok Kumar Mahapatra, All India Institute of Medical Science, Bhubaneswar, India.
E-mail: akmahapatra22000@gmail.com

challenges in their management. The purpose of this study is to highlight these difficulties and study the outcome of such patients at a level-1 trauma center in a developing country like India.

Materials and Methods

This was a retrospective study which was conducted at the Department of Neurosurgery, Jai Prakash Narain Apex Trauma Centre (JPNATC.), All India Institute of Medical Sciences (AIIMS), New Delhi, India. We analyzed data of head injury patients admitted from July 2008 to December 2010. Twelve patients whose identities could not be established at the time of admission and who were less than 20 years of age were included in the study. Conscious head injury patients who could identify themselves or serious head injury patients who were accompanied by somebody known to them or could be identified within 24 h were excluded from the study group. Data of these 12 patients was analyzed for demographic profile, mode of injury, presentation at the time of admission, management, and outcome.

Results

There were 70 unknown patients of all age group. Out of them only 12 were ≤20 years. All patients were male, maximum number, that is, eight (67%) patients belonged to age group 16-20 years. Only one (8%) patient was in age group of 1-5 years and three (25%) patients were between the age group of 11-15 years [Table 1 and Figure 1].

The most common cause of head injury was road traffic accident and was seen in eight (67%) patients. In three (25%) patients, the cause of injury was not known. At admission Glasgow coma scale (GCS) score of 8-12 was observed in eight (67%) of them and GCS <8 was present in four (33%) patients. The most common radiological findings were cerebral contusion 4 (33%). Diffuse axonal injury (DAI) in 3 (25%), extradural hematoma (EDH) in 3 (25%), and subdural hematoma (SDH) 1 (8%) of the patients [Table 2].

Six (50%) patients were treated conservatively. In three (25%) patients intracranial pressure (ICP) monitoring was

done (35%) of them needed surgical intervention. Among six (50%) patients, three (25%) were treated by decompression craniectomy, one (8%) by craniotomy and EDH evacuation, and 1 (8%) needed burr hole evacuation of chronic SDH. Motor score during admission was 4.67 ± 0.78 and at discharge was 5.5 ± 0.91 ($P = 0.005$), while eye score during admission was 2.08 ± 1.08 and at discharge was 3.67 ± 0.89 ($P = 0.001$), and verbal score during admission was 1.67 ± 1.07 and at discharge was 3.67 ± 2.01 ($P = 0.004$). These values suggest statistical improvement in GCS score at the time of discharge when compared with the values at admission [Tables 3 and 4].

Table 1: Age and sex distribution of patients (N=12)

Demography	Number of patients	Percentage
Gender		
Male	12	100
Female	0	0

Table 2: Clinical findings and type of lesion in head injury (N=12)

Causes of injury	Number of patients	Percentage
Road traffic accident	8	67
Cause was not known	3	25
Any other cause (assault/fall from height/any other)	1	8
Glasgow coma scale at admission		
GCS (13-15)	0	0
GCS (12-8)	8	67
GCS<8	4	33
Type of injury		
Extradural hematoma	3	25
Subdural hematoma	1	8
Cerebral contusion	4	33
Diffuse axonal injury	3	25
Subarachnoid hemorrhage	1	8
Other injury		
Chest injury	1	8
Abdominal injury	0	0
Limb fracture	1	8
Spinal injury	1	8

GCS – Glasgow coma scale

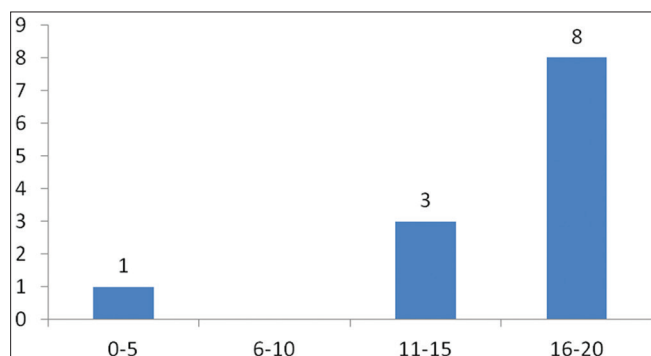


Figure 1: Age distribution of patients

Table 3: Treatment given at hospital (N=12)

Types of treatment	Number of patients	Percentage
Conservative	6	50
ICP monitoring	3	25
Surgery		
Decompression craniectomy	3	25
Craniotomy	1	8
Depressed fracture elevation	0	0
Burr hole evacuation	1	8
VP shunt	1	8

ICP – Intracranial pressure; VP – Ventriculoperitoneal

Complications like ventricular associated chest infection, surgical site wound infection, cerebrospinal fluid (CSF) leak, and sepsis were observed in one (8%) each [Table 5].

During discharge, two (16%) had good recovery, four (33%) had moderate disability, and five (42%) were severely disabled [Table 6].

Among 12 patients, identities of seven (58%) patients could be ascertained with the help of social workers and they were sent home at discharge, one (8%) patient who was identified but needed continued nursing care was referred to a district hospital, one (8%) died in the hospital, and three (25%) remained as unknown and rehabilitated through various social working organizations in destitute homes.

Discussion

Previous study has reported, out of 325 unknown patients, there were nine patients in the pediatric age group.^[10] In another study GCS scores of 3 to 8 indicate severe TBI and correlate significantly with the outcome; the motor score is the most reproducible and carries the most prognostic

Table 4: Score on glasgow coma scale during admission and during discharge (N=12)

	During admission	During discharge	P value
Eye score	2.08±1.08	3.67±0.89	0.001
Motor score	±0.78	5.5±0.91	0.005
Verbal score	1.67±1.07	3.67±2.01	0.004

Table 5: Other injuries and complication during treatment of patients (N=12)

Complications	Number of patients	Percentage
Pneumonia	2	16
Meningitis	0	0
Septicemia	1	8
Wound infection	1	8
CSF leak	1	8

CSF – Cerebrospinal fluid

Table 6: Outcome and destination of patients during discharge (N=12)

Outcome	Number of patients	Percentage
Glasgow outcome scale		
Good recovery	2	16
Moderate disability	4	33
Severe disability	5	42
Vegetative state	0	0
Death	1	8
Destination		
Home	7	58
Referred to district hospital	1	8
Destitute home	3	25

information.^[11] Nearly 80% of patients with an initial hospital GCS score of 3 to 5 have an eventual outcome of death, severe disability, or vegetative state; patient with an initial GCS score of 3 have a 65% mortality rate.^[12,13]

Previous study shows that Glasgow outcomescale (GOS) was assessed in 237/312 patients (76%) at an average of 15 months after injury. There was full recovery in 150 patients (63%), moderate disability in 70 (30%), severe disability in seven (3%), and death in ten (4.2%), also 82% of patients had post-concussive symptoms. Evidence of parenchymal damage was the only independent predictor of poor functional outcome ($P = 0.022$).^[14]

In Malaysia among all age groups, 11 (15.3%) patients died during hospitalization (15.3%). Out of remaining 61 patients, only 49 patients (80.3%) followed-up during first three months (with three deaths) and 45 out of 58 patients (77.6%) came for follow-up during subsequent 3 months (with no death detected). There were only 61 (84.7%) patients who were discharged from hospital, whereby 29 (40.3%) had good outcome (GOS 4 and 5), while the remaining 32 (44.4%) patients were with either severe disability or persistent vegetative state.^[15] Compared to these in our study, out of 70 unknown patients only 12 patients belonged to 20 years or less age group.

Patients who are brought to emergency department for head injury pose innumerable challenges for their management. These patients are usually found lying by the roadside in an unconscious state and are brought to hospital by policemen or passerby. Transportation of these patients from the site of accident to hospital in itself is fraught with dangers because these people who are genuinely trying to help them are not abreast with trauma care and transportation protocols of such patients. Lack of relatives at the site of injury adds to the negligence these patients may suffer. In a third world country like ours, there is an urgent need to increase the general awareness of people regarding prehospital trauma care protocols for such patients and we recommend that it be taught as part of curriculum in schools.

We are working in the apex trauma care center of the country and it is more often than not, that we encounter unknown patients being referred from peripheral hospitals, both government or private, for lack of proper facility and resources. Such patients can strain the economic resources of the hospital. Trained manpower is needed to provide them with necessary care. It is imperative to strengthen our healthcare delivery systems in peripheral hospitals because this will help in preventing unnecessary delay in initiation of the treatment for such unknown patients.

During their hospital stay, right from the time of admission till the time of discharge or death of these patients, difficulties

abound. These problems range from obtaining the consent for surgery and providing free of cost drugs, treatment, food, and nutrition. These patients can succumb to secondary insults, in case proper nursing care is not provided. Catabolic state, prolonged immobilization can result in pressure sores, contracture development at joints and recurrent nosocomial infections.

We have a dedicated team of social workers, physiotherapist, and paramedical staff who work around the clock for the rehabilitation of such patients, because of the adequate funding from Government of India and hard work of all team members; we have been able to rehabilitate many such patients. By virtue of these patients being the young age group, chances of recovery are good and some of these patients have been able to recall their addresses and phone number and have been reunited with their families. Our social workers remain in contact with non-government organization and patients whose identities could not be ascertained are rehabilitated through this network and are sent to destitute homes.

Some cases we did both decompressive craniectomy with cisternostomy. But we have no proper data to compare outcome between decompressive craniectomy and combined craniectomy and cisternostomy.

Conclusion

Unidentified patients of pediatric age group have better outcome if proper care is provided in time, for which proper training of staff and resources are needed in a developing country like ours. It is also imperative to increase general awareness regarding road safety measures, prehospital trauma patient care protocols, and improve our healthcare delivery system in the peripheral hospitals.

References

- Mahapatra AK. Monitoring on pediatric head injuries patients. *Neuron India* 1995;43:64.
- Sambasivan M. Epidemiology Paediatric head injuries. *Neuron India* 1995;43:57-8.
- Kraus JF. Epidemiology. In: Frost E, editor. Switzerland, Arien: Head injury clinical management and research Geneva 1990. p. 113-24.
- Sosin DM, Sniezek JE, Waxweiler RJ. Trends in death associated with traumatic brain injury, 1979 through 1992. Success and failure. *JAMA* 1995;273:1778-80.
- Consensus Conference. Rehabilitation of persons with traumatic brain injury. NIH consensus Development Panel on Rehabilitation of persons with Traumatic Brain Injury. *JAMA* 1999;282:974-83.
- Jennetr B, Teadale G, Galbraith S, Pickard J, Grant H, Braakman R, *et al.* Severe head injuries in three countries. *J Neurol Neurosurg Psychiatry* 1977;40:291-8.
- Marshall LF, Becker DP, Bowers SA, Cayard C, Eisenbergh H, Gross CR, *et al.* The National Traumatic Coma Data Bank Part 1: Design, purpose, goals, and results. *J Neurosurg* 1983;59:276-84.
- Guidelines for the management of severe head injury. The Brain Trauma Foundation. The American Association of Neurological Surgeons, The Joint Section on Neurotrauma and Critical Care. *J Neurotrauma* 1996;11:641-734.
- The Brain Trauma Foundation. The American Association of Neurosurgical Surgeons. The Joint Section on Neurotrauma and Critical Care. Trauma systems. *J Neurotrauma* 2000;17:457-627.
- Ahamad FU, Mahapatra AK, Mehta VS. Outcome "unknown" head injury patients at a tertiary care neurosurgical centre. *Neuron India* 2006;54:73-4.
- Choi SC, Narayan RK, Anderson RL, Ward JD. Enhanced specificity of prognosis in severe head injury. *J Neurosurgeon* 1988;69:381-5.
- Narayan RK, Greenberg RP, Miller JD, Enas GG, Choi SC, Kishore PR, *et al.* Improved confidence of outcome prediction in severe head injury. A comparative analysis of the clinical examination, multimodality evoked potentials, CT scanning, and intracranial pressure. *J Neurosurg* 1981;54:751-62.
- Fearnside MR, Cook RJ, mcdougall P, mcneil RJ. The West mead Head Injury Project outcome in severe head injury. A comparative analysis of pre-hospital, clinical and CT variable. *Br J Neurosurg* 1993;7:267-79.
- Smits M, Hunink MG, Van Rijssel DA, Dekker HM, Vos PE, Kool DR, *et al.* Outcome after complicated minor head injury. *AJNR Am J Neuroradiol* 2008;29:506-13.
- Liew BS, Johari SA, Nasser AW. Severe traumatic Brain Injury. Outcome in Patients with Diffuse Axonal Injury Managed Conservatively in Hospital Sultanah Aminah, Johor Bahru- An Observational Study. *Med J Malaysia* 2009;64:280-8.

How to cite this article: Nath HD, Tandon V, Mahapatra AK, Gupta DK. Outcome of pediatric head injury patients admitted as unknown at a level-i apex trauma centre. *Asian J Neurosurg* 2015;10:149-52.

Source of Support: Nil, **Conflict of Interest:** None declared.