

A study of clinical profile of paediatric head injury

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Abstract

Background: Trauma is the third leading cause of death in India, accounting for 9.6 percent of all deaths, whereas in case of children it is the third leading cause of death. Traumatic brain injury in children accounts for a large number of emergency department visits and hospital admissions and is reported to be the leading cause of death and disability in children around the world. **Objectives:** To study of clinical profile of paediatric head injury presenting to tertiary care center. **Materials and method:** A total 102 paediatric head injury were enrolled in the present study. All patients were analyzed and classified according to their age, sex, pattern of injury, symptoms and examination findings at the time of presentation, CT Brain findings (if done), Glasgow Coma score. Patients managed in either paediatric ward or paediatric intensive care unit depending upon their severity. **Results:** The incidence of head injury was two times more common in males (66.7%) compared to females (33.3%) and was more common in ≤ 5 years old children (45.1%). Fall from height was the most common cause (60.8%) of head injury in children followed by Accidents (25.5%). Vomiting (45.10%) and swelling (44.12%) were the most common presenting symptom. It was followed by altered sensorium (28.43%), seizures (24.51%), headache (21.57%) and associated injuries (21.57%). Majority of the patients were having the GCS score of >12 (62.75%) and ≤ 8 was in 10.78%. Skull fracture was the most common finding (29.73%) on CT scan. Cerebral edema was observed in 24.32% patients whereas normal report was observed in 21.625 patients. **Conclusion:** Thus we conclude that pediatric head injury in children was common in preschool male children. Fall from height and accidents were the most common cause of head injury. Vomiting and swelling were the most common presenting symptom. Skull fracture and cerebral edema was the most common finding on CT scan.

Key words: paediatric head injury, fall from height, vomiting, CT scan.

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INTRODUCTION

Trauma is the third leading cause of death in India, accounting for 9.6 percent of all deaths, whereas in case of children it is the third leading cause of death.¹ Traumatic brain injury in children accounts for a large number of emergency department visits and hospital admissions and is reported to be the leading cause of death and disability in children around the world.² The Center for Disease Control (CDC) and Prevention and the National Center for Injury Prevention and Control label traumatic brain injury (TBI) a “silent epidemic.”³ The reported mortality in developed countries with excellent emergency medical services is 9-35 percent.⁴ Although head trauma in children and adults has several

similarities, children should not be considered as young adults, given that the pediatric patients have a more susceptible cranial vault due to thinner and more pliable bones, open fontanelle, large head-to-torso ratio and the neck musculature is less developed. In addition to this, physiological differences are also present like difference in cerebral blood flow, myelination, and increased susceptibility of immature brain to excitotoxicity.⁵ Despite all this, it is seen that following traumatic brain injury, pediatric patients exhibit a significantly lower mortality rate compared to adults.⁶ Several factors influence childhood injuries, including age, sex, behavior and environment. Among all these, age and sex are the most important factors affecting the pattern of injury. Children of age up to 4 years and adolescents of age 15-19 years are most likely to sustain traumatic brain injury. In every age group, traumatic brain injury rates are higher for males than females. Males aged up to 4 years have highest rates of TBI related emergency department visits.⁷ In the present study we tried to study clinical profile of children presenting with head injury.

MATERIALS AND METHOD

Present observational study was conducted in the department of pediatrics of KEM hospital Pune, a tertiary care hospital with 28 bedded pediatric ward and 10 bedded pediatric intensive care unit. The study was conducted from February 2013 to April 2014. All paediatric patients between ages one to 16 years, admitted with a history of head injury were included in the study. Children with underlying seizure disorder and with bleeding disorder were excluded from the study. Thus total 102 cases of head injury were enrolled in the present study. Demographic data of the enrolled patients including name, age, sex, detailed address was recorded on a prestructured proforma. Details of trauma, time of injury, mode of injury, type of treatment received before arrival, state of consciousness, symptoms before and at presentation was also recorded. Clinical data including temperature, heart rate, respiratory rate and pattern, blood pressure, capillary refill time, associated injuries, modified Glasgow coma scale, detail neurological examination were noted. CT scan was performed in selected patients of required. All the patients were managed as per standard protocol. The collected data was entered in Microsoft excel and was analysed. Qualitative data such as symptoms and signs at presentation, CT brain findings expressed in frequency and percentage.

RESULTS

Table 1: Age and sex wise distribution of study patients

	Age (yrs)	No. of patients (n=102)	Percentage
Age group	≤ 5	46	45.1%
	5.1 – 10	35	34.3%
	> 10	21	20.6%
Gender	Male	68	66.7%
	Female	34	33.3%

In the present study incidence of head injury was more common in ≤ 5 years old children (45.1%). The incidence

of head injury was two times more common in males (66.7%) compared to females (33.3%).

Table 2: Distribution of patients with respect to mode of injury

Mode of Injury	Frequency	Percentage
Fall	62	60.8%
Accident	26	25.5%
Fights	03	02.9%
Strike	11	10.8%
Total	102	100.0%

It was observed that fall from height was the most common cause (60.8%) of head injury in children followed by Accidents (25.5%), Strike against any object (10.8%) and Fights (2.9%).

Table 3: Distribution of patients with respect to symptoms at the time of presentation

Symptom*	Frequency	Percentage
Vomiting	46	45.10
Headache	22	21.57
Altered Sensorium	29	28.43
Seizure	25	24.51
Laceration	24	23.53
Swelling	45	44.12
Depressed Fracture	7	6.86
Associated Injury	22	21.57

*Multiple responses obtained

It was seen that vomiting (45.10%) and swelling (44.12%) were the most common presenting symptom. It was followed by altered sensorium (28.43%), seizures (24.51%), headache (21.57%) and associated injuries (21.57%).

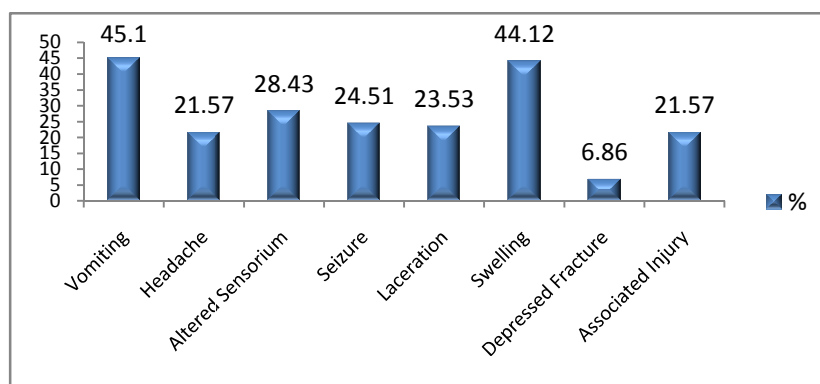


Figure 1: Distribution of patients with respect to symptoms at the time of presentation

Table 4: Distribution of patients with respect to clinical signs at presentation

Clinical signs		Frequency	Percentage
Respiratory Pattern	Normal	93	91.18
	Abnormal	9	8.82
Pulse	Absent	1	0.98
	Normal	94	92.16
Posture	Feeble	7	6.86
	Normal	92	90.20
	Flaccid	7	6.86
	Hemiparesis	2	1.96
Pupils	Decerebrate	1	0.98
	Normal	94	92.16
	Constricted	5	4.90
Glasgow coma scale	Dilated	1	0.98
	Unilateral dilated	2	1.96
Glasgow coma scale	≤ 8	11	10.78
	9 – 12	27	26.47
	> 12	64	62.75

It was observed that respiratory pattern was abnormal in 8.82% patients. Pulse was feeble in 6.68% patients. Posture was flaccid in 6.68% patients and hemiparesis was seen in 1.96% patients. Pupils were constricted in 4.90% patients whereas dilated in 0.98% and unilateral dilated in 1.96% patients. All the patients in the present study were evaluated by using Glasgow coma score also and it was seen that majority of the patients were having the score of >12 (62.75%) and ≤ 8 was in 10.78%.

Table 5: Distribution of patients with respect to CT scan findings

CT scan findings	Frequency (n= 74)	Percentage
Normal	16	21.62
Fracture	22	29.73
Cerebral Edema	18	24.32
Extradural hematoma	7	9.46
Subdural hematoma	3	4.05
Contusions	7	9.46
Herniation	1	1.35

In the present study CT scan was performed in total 74 patients and it was observed that skull fracture was the most common finding (29.73%). Cerebral edema was observed in 24.32% patients whereas normal report was observed in 21.625 patients.

DISCUSSION

The present study was conducted in the department of pediatric of KEM Hospital, Pune with the objective to study the clinical profile of patients associated with pediatric head injury. Total 102 children with head injury were enrolled in the present study. It was observed that incidence of head injury was more common in ≤ 5 years old children (45.1%). Holn Bon *et al*⁸

reported similar findings. Udoh *et al*⁹ found incidence more in 7-10 years old children. It was seen that boys (66.7%) were more prone to head injury as compared to girls (33.3%). Hassen *et al*,¹⁰ verma *et al*,¹¹ Chabok *et al*,¹² Bhargawa *et al*,¹³ and Shao *et al*¹⁴ also reported similar findings in their studies. Fall from a height constituted the commonest cause of head injury (60.8%) in the present study, followed by road traffic accidents (25.5%), Strike against any object (10.8%) and Fights (2.9%) were observed. Bhargawa *et al*,¹³ Shao *et al*¹⁴, Siraj *et al*,¹⁵ and Lee *et al*¹⁶ reported similar findings in their studies. However Chabok *et al*¹² found accidents as the commonest cause. Anderson *et al*¹⁷ found the highest incidence of TBI during play followed by hit by another person and baby nursing in decreasing order. They concluded that supervision during play at home as well as better designed schoolyards and playgrounds are required to prevent accidents. Verma *et al*¹⁸ studied childhood trauma profile and found head and neck injuries as most common site of injury and falls and road traffic accidents as most leading cause of injury. Zhu *et al*¹⁹ had done a study to investigate injury patterns and the use of computed tomography among Chinese children with traumatic brain injury (MTBI). Total 455 children up to 14 years of age with MTBI treated in emergency department included in study. They found leading causes for the mild traumatic brain injuries were falls, traffic collisions, and blows against/by objects. Very few children with mild traumatic brain injuries had clinically-important Brain injury. Lee *et al* studied pediatric head injury in 96 patients at Kyungpook National University Hospital, Korea. They Found that Pedestrian vehicle accident and fall as leading causes.¹⁶ It was seen that vomiting (45.10%) and swelling (44.12%) were the most common presenting symptom. It was followed by altered sensorium (28.43%), seizures (24.51%), headache (21.57%) and associated injuries (21.57%). It was observed that respiratory pattern was abnormal in 8.82% patients. Pulse was feeble in 6.68% patients. Posture was flaccid in 6.68% patients and hemiparesis was seen in 1.96% patients. Pupils were constricted in 4.90% patients whereas dilated in 0.98% and unilateral dilated in 1.96% patients. All the patients in the present study were evaluated by using Glasgow coma score also and it was seen that majority of the patients were having the score of >12 (62.75%) and ≤ 8 was in 10.78%. Grinkeviciute *et al*²⁰ reported a threshold of 5 for GCS was associated with potential mortality in children with severe head injury. Kamal *et al*²¹ reported GCS < 12 as an important predictor of death or neurological deficit. Suresh *et al*²² and Udoh *et al*⁹ found GCS score of ≤ 8 as a poor predictor of outcome. Ghaffarpasand *et al*²³ suggested in pediatric age group the cut-off value for severe traumatic

brain injury should be set at 5 instead of 8 in order to predict the outcome more precisely. In the present study CT scan was performed in total 74 children and it was observed that skull fracture was the most common finding (29.73%). Cerebral edema was observed in 24.32% children whereas normal report was observed in 21.625 children. Ciurea *et al*¹² reported similar findings in their study, whereas Suresh *et al*³⁰ found contusions as the most common finding and Bhargawa *et al*¹³ found extradural hematoma as most common lesion on CT brain in pediatric patients of traumatic head injury. Cerebral edema, extradural hematoma, subdural hematoma and cerebral herniation were found to be associated with poor outcome. Three patients had subdural hematoma out of which two expired and 1 was disabled. One patient had cerebral herniation that expired in the course of treatment. Hassen *et al*¹⁰ studied demographic and epidemiologic characteristics of pediatric traumatic brain injury (TBI) in 298 Tunis children. They found that TBI two times more common in boys compared to girls, mild traumatic brain injury as most common type of injury and accidents at home as most common mechanism of injury. They concluded that pediatric traumatic brain injury is a frequent and serious pathology and epidemiologic studies can contribute to the development of prevention program in order to decrease its incidence in the target population.

CONCLUSION

Thus we conclude that pediatric head injury in children was common in preschool male children. Fall from height and accidents were the most common cause of head injury. Vomiting and swelling were the most common presenting symptom. Skull fracture and cerebral edema was the most common finding on CT scan.

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