

ORIGINAL ARTICLE

Head Injuries in Pediatric Population at DHQ Teaching Hospital HaripurJaved Iqbal Khan¹, Hassan Nasir², Tahir Iqbal Khan³, Noreen Sultan⁴, Tahir Angez Khan⁵, Mehwish Naz⁶**ABSTRACT****Objective:** To study the frequency of head injuries in pediatric population at DHQ Hospital Haripur.**Study Design:** Descriptive cross-sectional study.**Place and Duration of Study:** We carried out this study for six months from 01.09.2018 to 28.02.2019 at the department of Surgery, DHQ Teaching Hospital Haripur.**Materials and Methods:** In this study, 110 children aged upto 12 years who sustained head trauma were included in this study. After initial assessment (conscious levels was checked by using Glasgow coma scale, any changes in pupils were noted and CT scan was performed wherever indicated), patients were shifted to the department of surgery for admission. Those needing surgery were operated after further clinical evaluation and CT scan findings.**Results:** Total number of patients was 110. Age ranged from 1 to 12 years with a mean age of 5.7 years. Out of the total 110 patients, 75% presented between 3 to 8 years. The presenting symptoms were vomiting in 52.7%, peri-orbital swelling in 14.5%, scalp swelling in 20.9% and 36.3% had loss of consciousness.**Conclusion:** It is concluded that the frequency of head injury is quite common in our community. Children of younger age with male preponderance are more vulnerable to acquire this injury and fall from height and road traffic accidents are major preventable causes.**Key Words:** Brain injuries, Coma, Head trauma, Unconsciousness.**Introduction**

Head trauma is a frequent occurrence in children and on most occasions, it results in traumatic brain injury needing active intervention and emergency management. It is a common cause of the loss of consciousness, long term functional problems and mortality in trauma patients.^{1,2}

Head injury is defined as an injury to the cranium, meninges and/or brain.³ Children with their proportionately large heads and flexible consistency of skull bones frequently sustain head injuries.⁴ Many protective measures have been adapted to reduce head injuries in pediatric population but still it is major health threat because of above mentioned facts.

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Because of several known reasons head is most frequent part of the body affected by traumatic insults in children and the reason for hospitalization. However, majority of head injuries are minor.⁵ Road traffic accident (RTA) and falling from heightened places are most common causes of traumatic head trauma. In developing countries like Pakistan, some important causes include ignorance of traffic rules, badly maintained vehicles, limited zebra crossings, nonfunctioning air bags, less use of seatbelts and overcrowded roads. This and similar studies can help to set protocols for early recognition of potentially treatable causes of mortality and morbidity and will help in better usage of available resources.⁶

Severity of traumatic brain injury is assessed with Glasgow Coma Scale (GCS) along with other parameters and is characterized as minor, moderate, and severe brain injuries on the basis of score with little changes in scoring for children. A GCS score of 9 or less indicates serious head injury, 13 and above denotes minor head injury and in between is taken as moderate injury.⁷

Another way of assessing severity of head trauma is to locate part of tissue damaged. Bleeding from scalp vessels can severely affect hemostasis of child. Similarly subdural hemorrhage, intracranial hemorrhage and injury to brain parenchyma or its

edema can threaten child's survival. In the same way hemorrhage below galea can spread around and lead to significant loss of blood which can cause hypovolemic shock and hence endanger the life of a child and must not be ignored.⁸ A lot of research has been conducted and being conducted to improve the assessment of severity of brain injury, devise protocols for prompt resuscitation and immediate intervention in indicated patients and all this has contributed significantly in the management of such injuries.^{9,10}

Hemorrhage inside brain parenchyma or its direct tear, bleeding in sub arachnoid space, sub dural or extra dural space can lead to coma and later death or disability. Even in minor head trauma, 6 to 30 % cases have injuries to brain or its coverings.⁸

In all cases of head injuries, one common mode of damage to brain tissue is loss of either complete or partial blood supply and this single factor has most important impact on outcome of poor child.^{11,12} After identifying this factor, efforts are being made to determine methods to urgent revascularization if ischemic area in the hope of recovering its function.^{13,14}

Head injury patients usually require x-ray skull, CT scan, MRI and other routine investigations to access clinical evaluation for their proper management.

This study will help to outline different types of brain injuries and to set protocols for their early management and better prognosis of these children and will achieve objective of improving understanding and management of head injuries in children and will open gates for further research in this context. Hence, a study was planned to study the frequency of head injuries in pediatric population at department of surgery, DHQ hospital Haripur

Materials and Methods

It was a cross sectional descriptive study in which 110 children aged below 12 years with head injury who presented in emergency department at DHQ Teaching Hospital Haripur from 1st september 2018 to 28th February 2019 were included through convenient sampling technique after permission from hospital ethical review committee. Children with other comorbidities were excluded.

A quick primary survey and emergency resuscitation was performed on all patients wherever indicated. This was followed by a detailed secondary survey to

look for the associated injuries. Data was collected by the medical officers through already designed proforma.

Complete blood count, and x-ray skull, CT scan was done. Provisional diagnosis was made in the emergency department and necessary treatment was instituted. Complications like meningitis, post-traumatic seizures, CSF fistula, Epilepsy and hemiplegia were all documented.

Statistical analysis was done using SPSS version 20.0. Frequencies and percentages were calculated for categorical variables such as gender, mechanism of injury, clinical presentation, skull injury, associated injuries, investigations, provisional diagnosis, treatment, and complications. Mean with standard deviations were reported for continuous variables.

Results

The mean age of study patients was 5.7 ± 2.7 years ranging from 1 to 12 years. Almost 75% of the children were between 3 and 8 years. Out of the total, 11 (10.0%) were between 1 and 2 years while 18 (16.4%) were between 9 and 12 years.

In our study majority of the cases 62 (56.4%) were males as compared to 48 (43.6%) females. The male to female ratio was 1.3: 1.

On average patients remained hospitalized for 1.9 ± 1.2 days, ranging from 1 to 8 days. Almost 80% of the study patients required 1 to 2 days of hospital stay while 25 (22.7%) of the patients needed 3 or more days of hospital stay.

The mechanism of injury is illustrated in table 1. The GCS level was noted in the study patients. In 3 (2.7%) cases it was less than or equals to 8. In 10 (9.1%) cases the GCS level was between 9 and 12. However, in majority of the cases 97 (88.2%) the GCS level was between 13 and 15.

Vomiting was the presenting symptom in 58 (52.7%) patients, orbital swelling in 16 (14.5%) cases and scalp swelling in 23 (20.9%) patients. Forty (36.3%) patients had history of loss of consciousness. Other complaints included nasal bleeding and convulsions in 3 (2.7%) patients, ear bleeding in 4 (3.6%) patients.

The mean systolic BP was 98.8 ± 11.4 while the diastolic BP was 66.0 ± 8.5 mmHg. The average heart rate in the study patients was 78.8 ± 10.5 ranging from 60 to 136. Similarly, the average respiratory rate was 29.2 ± 6.2 ranging from 20 to 45.

Out of total, 44 patients had skull injuries, 32 (29.1%)

had single skull fracture, 6 (5.4%) had linear fracture, whereas 5 (4.5%) had multiple fractures. One (0.9%) patient had wound on the right temporal and frontal region.

Out of the total 110 patients, 53 (48.1%) had no fracture on x-ray skull. Twenty-eight (25.4%) patients had linear fracture, 21 (19.1%) had single fracture while 6 (5.4%) had depressed fracture and 2 (1.8%) had multiple fractures.

CT scan was done in 93 patients and CT scan findings are illustrated in table 2. Different management options needed by the patients are illustrated in table 3.

Table I: Mode of Injury in the Study (n = 110)

	Number	%age
Fall from roof	52	47.3%
RTA	26	23.6%
Fall from stairs	13	11.8%
Fall from bed	3	2.7%
Fall from window	1	0.9%
Abuse	1	0.9%
Others		
Fall from tree	8	7.3%
Fall from wall	3	2.7%
Fall from Almira	1	0.9%
Fall from mountain	1	0.9%
Stone hit	1	0.9%

Table II: CT Findings in Patients (n=93)

CT Findings	Number	%Age
Normal	71	64.5
Diffuse axonal injury	8	7.2
Epidural hematoma	7	6.3
Subdural hematoma	2	1.8
Temporal hematoma	2	1.8
Frontal hematoma	2	1.8

Table III: Mode of Treatment Given to Patients (n=110)

Treatment mode	Number	%Age
Iv fluids +antibiotics	108	98.2
Iv steroids	26	23.6
Neurological management	11	10
Iv mannitol	1	0.9
Elevation of depressed fracture	7	6
Evacuation and debridement	5	4.5

Discussion

Head injury is common occurrence in children and presents to the accident and emergency (A&E) department quite frequently but majority of them

sustain minor injuries (in this study 97% children were having GCS of 13-15). In our study, most (75%) of children were in age group from 3-8 years and fall from height was major cause (47.3%). According to most of the previous reports, male gender has suffered more than females.²²

In third world countries incidence of head injuries is on the rise and most important contributing factors include increased traffic, ignorance about road sense, decreased safety protocols in major industries, falls from heights and firearm penetrating injuries. Road traffic injuries are an increasing dilemma globally but the incidence in South and East Asia is increasing rapidly and need special attention.¹⁵

Trauma to brain is responsible for 25 to 35 % of all deaths resulting from accidents and is a cause of most deaths in trauma patient in different hospitals worldwide as reported by some studies.¹⁶ One major cause of head injuries is accident caused by motor cars, trolleys, and motorcycle injuries. Fall from heighted places like mountains or high-rise buildings, physical attacks from enemies and firearm penetrating injuries to skull are another important causes of head injuries which is well depicted in present study. Sometime injury to brain is a part of poly trauma involving many organs, but it can also occur in isolation which is comparable to present study.¹⁷

There is evidence from different parts of the world indicating that incidence of head injuries is rising steadily.¹⁸ A study by Sosin et. al. reported that a huge proportion (28%) of deaths in trauma patients were caused by traumatic brain injury alone.¹⁹

Another report from Indian held Kashmir who worked on head injury related morbidity and mortality, revealed that pediatric population of age less than 10 years was major sufferer of these catastrophes which is very much like present study statistics.^{20,21} These statistics are comparable to present study.

In one report RTAs (44.4%) were mainly responsible for sustaining traumatic head injury followed by falls from heighted places which were responsible for approximately 32.2% cases.²⁰ Different types of physical assaults accounted for 19.0% cases of head injury. Comparatively in our study fall from roof was most common (47.3%) mode of head injury and RTAs

were responsible for many patients (24%) to land in emergency department with head injuries, while other significant modes of injury were also fall either from tree, stairs, or bed. This very well may be attributed to our living styles.

In most of the cases minor and moderate head injured patients required up to 2 days of hospital stay.²³ In our study, the average hospital stay was 1.9 days with almost 80% had hospital stay of 1 to 2 days. This could be due to grading of injury, as in our case, most of the head injuries were diagnosed as concussions.

The study by Yattoo GH and colleagues reported that 80% of their patients had GCS score of 15 while 10% had 13-14 and 5.3% had 8 to 12 GCS level while another 5% had GCS score less than 8.²⁰ In our study almost 88% patients had GCS between 13 and 15, 9% had it between 9 and 12 while 3% had GCS level below or equals to 8. Again, this could be due to severity of injury as mentioned most of the patients had concussions in our study. CT scan findings were also comparable.

The nature of head injuries in our study was mostly minor to moderate. None of our patients died. Those patients (6%) having depressed fracture were elevated and in 5% of the patient's evacuation and debridement was done via surgery. No significant side effects or complications were witnessed in our patients except for headache in 2.7% and hemiplegia in 1% children was witnessed.

One of the limitations of our study was its descriptive methodology.

The strengths and advantages of the current study are the scope of information gathered. In the current study data regarding patient's demographics, hospital stay, mechanism of head injury, presenting complaints, physical examination, nature of skull injuries and associated injuries, radiography in the form of both x-rays and CT scan were recorded. This is one of the few studies auditing head injuries in children in the local settings.

The details of present study suggest that we should focus on prevention of head injuries in pediatric population by educating children at different stages of their life. This can be started at home by parents, later by teachers in school going children and can be supplemented by social organization working for children in liaison with health care workers.

Anticipatory counseling of caretakers can be done to understand the patterns and priorities during early age of a child.

Conclusion

It is concluded that fall from height is a common cause of injury and early radiographic evaluation specially, CT scan is very important in determining nature of head injury and its management.

There is a need of initiatives for careful planning to prevent head injuries in children with active involvement of people responsible for their care at different stages of their development and growth.

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