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AN UNPRECEDENTED RISE IN ACCIDENTAL HEAD INJURIES IN CHILDREN DURING 2020 LOCKDOWN PHASE OF COVID SARS COV 2 PANDEMIC

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ABSTRACT

Background: Head injury is a noteworthy cause of morbidity and mortality worldwide, especially in the paediatric age group. It is a common reason for presentation to emergency departments but the majority (80% to 90%) of head injuries are mild. **Aim:** To elucidate the types of head injury, the intervention given, the course of illness in the hospital and the outcome. **Method:** The study was conducted for a period of six months among 21 children who had head injury and below the age 14 during the lockdown period. History of head injury, classification based on the type of injury, stages of sensorium and intervention required was noted. **Results:** Among the 21 subjects, 7 were below 2 years and 14 above 2 years. 11 were males and 10 females. Details of type of injury were noted. Seven needed ventilation and the mortality was 2 out of the 21 subjects.

KEYWORDS: Head injury and Pandemic Lockdown.

INTRODUCTION

The current COVID-19 pandemic has affected over 9 crore around the world causing 2,031,317 deaths so far. This situation prompted governments all over to take the unprecedented step of complete 'lockdown' wherein all activity was restricted and individuals were forced to stay and work from home as much as possible.

The American Association of Neurologic Surgeons defines traumatic brain injury (TBI) as a blow or jolt to the head or penetrating head injury that disrupts the normal function of the brain. Mild TBI may result in a brief change in mental state or consciousness while severe TBI in children is a significant cause of morbidity and mortality worldwide.[1] Falls or unintentional injuries are the most common type of injury, followed by motor vehicle-related accidents.[2,3] During the pandemic, children were forced to stay at home and had no social and interactive activity as they could not go out to play or meet friends and schools were closed. This resulted in over activity at home often unattended by seniors. Furthermore, child abuse remains a major cause of head trauma in children under 2 years of age. The percentage of each contributing factor differs between studies and the distribution varies according to age and gender. Infants and young children are more vulnerable to abuse because of their dependency.[4]

In fact many countries are indicating a dramatic increase in reported cases of domestic violence.[5] Children were neglected during such domestic violence adding to the accidental injuries in children. This study was undertaken to understand the head injuries among children during this ongoing SARS CoV 2 pandemic.

Aim & objective: To elucidate the types of head injury, the intervention given, the course of illness in the hospital and the outcome.

MATERIAL AND METHODS

Study Area

This study was conducted in the Department of Paediatrics in a tertiary care hospital in Mumbai.

Study Design

Prospective and retrospective observational study.

Study Period

March 2020 to August 2020.

Study Population
Children of age less than 14years admitted in paediatric intensive care unit with history of head injury.

Inclusion Criteria
Children up to the age of 14 years with a history of head injury.

Exclusion Criteria
- Cases Other than head injury.
- Subjects who have not given consent.

Sample Size
Children of age less than 14 years who presented to Paediatric department with head injury during the study period were enrolled.

Sampling technique
Simple stratified sampling method.

Study Variables
Stage of sensorium and intervention and followed up till the final outcome.

Study Tools
Pre-designed pre-tested questionnaire.

Data collection methodology
- The approval from the ethics committee was obtained for this study.
- Informed consent regarding participation in the study is obtained in the regional language.
- The pre-designed pre-tested questionnaire was explained to the mother or caregiver.
- Babies/children were clinically assessed for age, gender, weight, fever and other systemic neurological findings.
- A complete clinical examination of the baby/child was carried out.
- Pre-structured proforma was used to record the information from each individual.
- All the children with history of head trauma were classified according to type of head injury, vitally stabilized, neuroimaging (CT Brain/ MRI brain) was done and neurosurgery referral was done immediately with no delay and appropriate intervention depending on the clinical and imaging status was done.

Data analysis
The collected data was coded, entered into Microsoft excel work sheet and exported to SPSS. Data was analyzed using SPSS version 21. Data is presented as percentage in categories and tabulated.

RESULTS

A total of twenty one (n= 21) subjects were included in the study. There were eleven (52.3 %) males and ten (47.7%) females. Seven (33.3%) of them were below two years of age and fourteen were above two years (66.7%) (Table 1).

Nineteen (90.4%) subjects fell from a height and two (9.6%) had accidental hits (table 2). None of the subjects reported concussion. The symptoms exhibited were loss of consciousness in five (23.8%) subjects, vomiting in seven (33.3%) and seizures in seven (33.3 %) subjects. The staging of sensorium done for the twenty one subjects of which four patients (19.1%) had GCS less than eight and seventeen patients (80.9%) had GCS above eight. Linear skull fracture was reported in seven (33.3%) subjects and depressed fracture was seen in three (14.2%)subjects. Parenchymal involvement was seen in eight subjects of which five (23.8%) had cerebral contusion and three (14.2%) had intra parenchymal hematoma. Diffuse brain swelling was reported in one (4.7%) subject. Hematoma was seen in eight subjects of which five (23.8%) had epidural hematoma and three (14.2 %) had subdural hematoma. Three (14.2%) subjects had subarachnoid hemorrhage.

Of the 21 subjects, seven subjects (33.3%) required ventilation, seven (33.3%) required neuro surgery intervention and were operated, twelve subjects (57.1%)did not need any intervention. Only one (4.7%) subject needed orthopedic intervention (Table 3).

Table 1: Distribution of subjects according to age and gender.

Age group	Frequency	Percent
< 2 years	07	33.3%
>2 years	14	66.7%
Total	21	100%
Gender		
Males	11	52.3%
Females	10	47.7%
Total	21	100%

Table 2: Distribution of subjects according to type of injury.

History of fall	Frequency	Percent
Fall from a height	19	90.4%
Accidentally got hit	02	9.6%
Symptoms		
Loss of consciousness	05	23.8%
Vomiting	07	33.3%
Seizures	07	33.3%
Sensorium stages		
GCS <8	04	19.1%
GCS >8	17	80.9%
Types		
Concussion	0	-
Skull fracture		
Linear	07	33.3%
Depressed	03	14.2%
Parenchymal		
Cerebral contusion	05	23.8%
Intra parenchymal hematoma	03	14.2%
Diffuse brain swelling	01	4.7%
Hematoma		
Epidural	05	23.8%
Subdural	03	14.2%
Hemorrhage subarachnoid	03	14.2%

Table 3: Distribution according to intervention.

Intervention	Frequency	Percent
Ventilation (19/21)		
Yes	07	33.3%
No	12	57.1%
Neuro surgery intervention (19/21)		
Operated	07	33.3%
Non-operated	12	57.1%
Ortho intervention (1/21)	01	4.7%
Mortality	02	9.5%

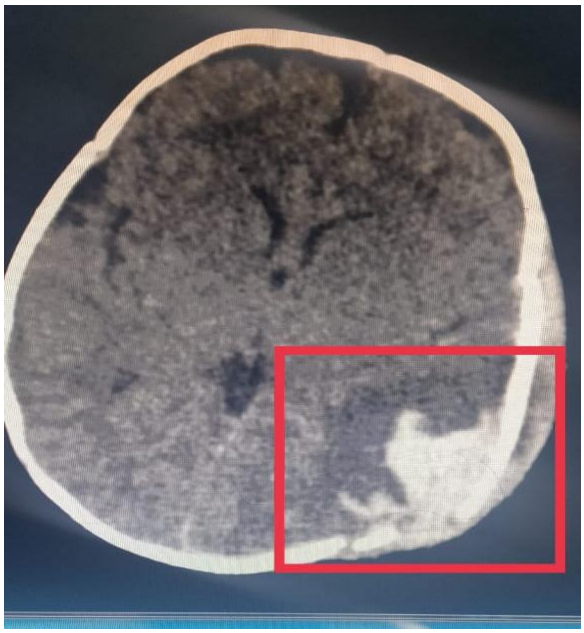

Figure 1: Showing CT of a 1 month old patient with left temporo- parietal fracture and subdural hematoma.

Figure 2: Showing Xray AP view skull of a 1 year old patient with left temporo-parietal fracture.

DISCUSSION

Head injuries account for considerable number of admissions among children which could be accidental or inflicted. The present study was done during the SARS CoV 2 Covid pandemic lockdown 2020 as there was an unprecedented increase in admissions of children with accidental head injuries.

TBI (Traumatic Brain injury) in children results in a range of traumatic injuries to the scalp, skull and brain that are comparable to those in adults but differ in both pathophysiology and management. The differences are attributable to age related structural change, mechanism of injuries based on physical ability of the child and the difficulty in neurological evaluation of paediatric population. The scalp is highly vascularized and a potential cause for lethal blood loss. Even a small loss of blood volume can lead to hemorrhagic shock in a newborn, infant and a toddler, which may occur without apparent external bleeding.[4]

TBI is classified as mild (Glasgow coma scale [GCS]13-15), moderate (GCS 9-12), or severe (GCS 3-8).[5] Children less than or equal to 10 years of age with a GCS of less than or equal to 8 or a strong suspicion of injury despite normal plain films (anteroposterior [A/P] and lateral view for children, without an A/P view), or if plain films are inadequate, should undergo computed tomography (CT) scanning of the cervical spine within an hour of presentation or when sufficiently stable.[6] Responsiveness is assessed with the Alert, Verbal, Pain, Unresponsive system and with the GCS.[5] and its modified Paediatric GCS.[7]

CT is the most helpful and most definitive way to assess the severity of TBI.CT provides all essential information necessary to make a decision regarding the presence or absence of significant intracranial injury and whether emergency operative intervention is required.[8,9,10] In addition, Magnetic Resonance Imaging (MRI) has facilitated accurate diagnosis, appropriate selection of treatment, prevention of further complications such as higher brain dysfunction as well as post traumatic seizures.[4]

During the lockdown phase of the pandemic children were locked up involuntarily at home with no outdoor activity and schools being closed. Thus this study was done to study the increased incidence of accidental injuries in children during this lockdown phase of 2020 SARS CoV 2 pandemic.

According to a study, mentioned in an article on May 5 2021, developmental behavioural paediatrician Dr Samir H Dalwai said unfortunately children in various age groups or slowly becoming a victim of a pandemic in a different way for the Quarantine and frequent lock downs can cause acute panic, anxiety, obsessive behaviour and post tramatic stress disorder, which cannot be ignored.

In a study by R M. Reece and R. Sege in the year 2000, suggested a mean age of 2.5 years and male predominance. Their study also reported 81% accidental head injuries.[6] Patrick K, Simon J, Andrea L Vincent, Peter Reed in their study in the year 2015, reported age between 6 months to 13 years were the median was 7 months for those below 2 years and median of 3 years for those above 2 years.[7]

The present study had nineteen patients (90.4%) due to fall from a height and two patients (9.6%) were accidentally hit.

L Trefan, R Houston et al in a study in the year 2016, mentioned that the children who died had a GCS <8, whereas in the present study though 4 subjects had GCS <8 all 4 survived.[8]

A study by K. Maheswari (2017) portrayed 58.4% had vomiting and 1.8% had seizures among 53 subjects, which is comparable to the present study in which 33.3% had vomiting and 33.3% had seizures.[9] Concussions were 14% and Linear fracture was noted in 54% subjects in the study done by R M. Reece and R. Sege in the year 2000. In the present study no patient had concussion but seven patients (33.3%) had linear fractures.[6] Fourteen patients (66.7%) were above 2 years and almost or equally distributed among the genders. A study by R M. Reece and R. Sege in the year 2000 suggested a mean age of 2.5 years and male predominance. Their study also reported 81% accidental head injuries.[6] Patrick K, Simon J, Andrea L Vincent, Peter Reed in their study in the year 2015 reported age between 6 months to 13 years, the median age was 7 months for those below 2 years and median of 3 years for those above 2 years.[7]

R M. Reece and R. Sege in the year 2000 also suggested in their study, parenchymal contusions contributed to 10%. The present study had 23.8%.[6] Linear fractures are the most common followed by frontal, occipital and temporal fractures in the study by Bonfield CM, Naran S, Asetayo OS et al. in the year 2014.[10] 38 % had hematomas. R M. Reece and R. Sege reported 8% had SDH, 38% SAH and 10% had subgaleal hematomas.[6] One percent epidural or subdural hemorrhage was reported in a study in 2002 by Mary E Case.[11] Subarachnoid hemorrhage was reported in 9% subjects by R M. Reece and R. Sege and this study reported 14.2%.[6]

In our study out of 21 patients, eleven (52.3%) were males and ten (47.7%) were females. Seven (33.3 %) of them were below two years of age and fourteen were above two years of age. Of the 21 subjects nineteen (90.4%) subjects fell from a height and two (9.6%) had accidental falls.

Seven (33.3 %) out of 21 patients were ventilated and seven needed neurosurgery intervention. One patient (4.7%) needed orthopaedic intervention. Two (9.5%) children died of which one patient had history of fall from height leading to trauma in left parietal region followed which child had loss of consciousness with a decerebrate posture, and a GCS of 4/ 15. The second patient had a history of fall from a height of 12 feet following which child developed vomiting and seizures with a GCS of 5/15, required ventilation with sub-galeal haematoma, thin EDH (Extra dural hematoma), thin right SDH (Sub dural hematoma), with linear undisplaced skull fracture and cerebral edema. Patient required right fronto-parietal expansion cranioplasty with evacuation of right frontoparietal SDH(Sub dural hematoma) with lax duroplasty using Pericranium. Tracheostomy was done, however child expired within two days.

Out of 21, four patients (19.1%) had a GCS of less than 8/15 and 17 patients (80.9%) had a GCS of more than 8/15. The present study reported a mortality of 9.5% (2 patients) which is similar to R M. Reece and R. Sege study results. A mortality of 0.4% (n=24) was reported in the study done by L Trefan, R Houston et al in the year 2016.[8]

CONCLUSION

Thus this pandemic has forced children to stay indoors and this extended months of being cooped up indoors has caused anxiety, hyper activity with nothing to do at home and led to many accidental injuries despite of adults being at home. Added to this many cases of domestic violence have been reported during the pandemic leaving the children unattended further culminating to increased number of accidental injuries in children.

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