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Article

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Traumatic cerebellar hematoma in paediatric patient – a case report and review of literature

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Abstract: Paediatric trauma is common emergency in emergency departments of hospitals worldwide. One of the uniqueness is the trauma sustained mostly in household areas and even the mode of injury is often subtle. Paediatric head injury is the one of the common reasons for children visiting the emergency department. Expert management and gentle care is an essential requirement in paediatric head injury cases. The management of the paediatric traumatic brain injury certainly depends upon the clinical conditions of patient and computed tomography {CT} findings. Most of the traumatic brain injuries can be managed conservatively but at times the surgical management has to be undertaken. A 6 month old child admitted with the history head injury. NCCT head revealed cerebellar hematoma with overlying subdural haemorrhage. Initially the child was managed conservatively but as the sensorium deteriorated the surgical evacuation was performed. The paediatric post fossa traumatic haemorrhage is a relatively uncommon and the management also needs to be individualized as per the patient's condition.

Key words: Pediatric Head Injury, Traumatic Cerebellar Hematoma

Introduction

Trauma has become a global burden over the society in terms of mortality and morbidity world over. The adults as well as children both are affected in traumatic injuries but the scenario is worse with the children. The spectrum of injuries is sometimes different in paediatric population. The deficits happen even after minor injuries yet extraordinarily more noteworthy deficits occur after serious head trauma.

Head injury in children represents a huge amount of emergency department visits and hospital visit every year and continues to be a major cause of mortality and disability in patients above one year of age. Falls are the most frequent kind of injury, followed by road traffic accident.1 Traumatic brain injury (TBI) is a leading source of childhood injury, with the Centre for Disease Control (CDC) stating that in the USA alone, almost half a million

(473,947) emergency department (ED also referred to as accident and emergency departments) visits for TBI are made annually by children aged 0 to 14 years. The children of 0-4 years were the commonest population amongst these subset of patients. (2) The fact that most are sustained in the home of the child itself is an interesting fact. In India over 40 % populations is under 15 year age. Mahapatra et al in 1995 found that 30% head injury subjects were in paediatric population under the 15 years age. (3)

The various modes of injury in children are fall from height, road traffic accidents, sports injuries, assault, objects falling over head, battered children. An observation of the head injuries in children from AIIMS Delhi is detailed as under (Table 1). (3)

Table 1

Various modes of injuries in children, AIIMS observation of 183 patients

Mode	Number
Fall from a height	101
Road traffic accidents	71
Assault	09
Sports injury	02

The paediatric TBIs need an expert management. The importance of gentle nature of care given to a paediatric patient cannot be overemphasised. The initial management of the patient is same as for others emergencies includes ABC protocol, assessment of consciousness and non-contrast computerized tomography [NCCT]. The consciousness is assessed using modified Glasgow Coma Scale (GCS) {Table 2}. Traumatic posterior fossa haemorrhages are relatively rare entity in children. The incidence of cerebellar hematoma is even rarer. We here report a case of child of 6 month with head injury resulting in cerebellar hematoma and overlying subdural haematoma (SDH) admitted in our institution.

Case report

A 6 month baby was admitted in neurosurgical ward of our institute with the history of sustaining head injury due to falling of television set overhead. On admission the modified GCS for the child was 14/15. The NCCT head was done as per the protocol. It was suggestive of the right cerebellar hematoma of 1.0 cm with overlying thin SDH with overlying subgaleal hematoma and linear fracture of the ipsilateral occipital bone (Figures 1, 2). The conservative management was started. The sensorium of the patient deteriorated six hours later and the decision for the operative intervention was undertaken. Right suboccipital craniectomy was performed. The cerebellar hematoma with subdural hematoma was evacuated. The child was postoperatively shifted to ICU and extubated later. The child was discharged on 4th postoperative day uneventfully. On two months follow up child presented with refusal to feed and episodes of vomiting, NCCT head was suggestive of the hydrocephalus (Figure 3). The ventriculoperitoneal shunt was performed (Figure 4). The child was discharged on 2nd postoperative day after shunt. On six month follow up the child was fine with no neurological deficits.

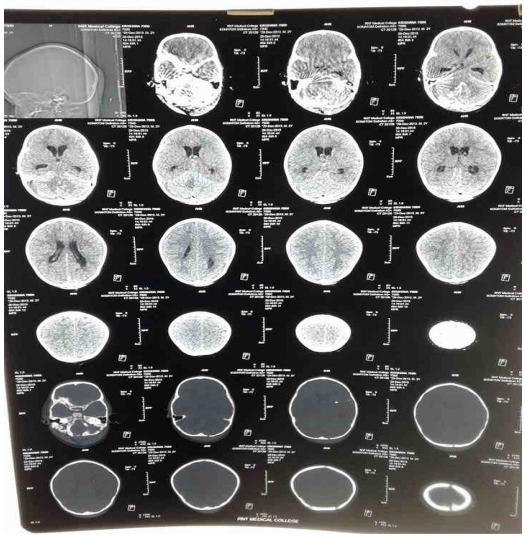


Figure 1 - CT head showing cerebellar hematoma with SDH with occipital bone fracture

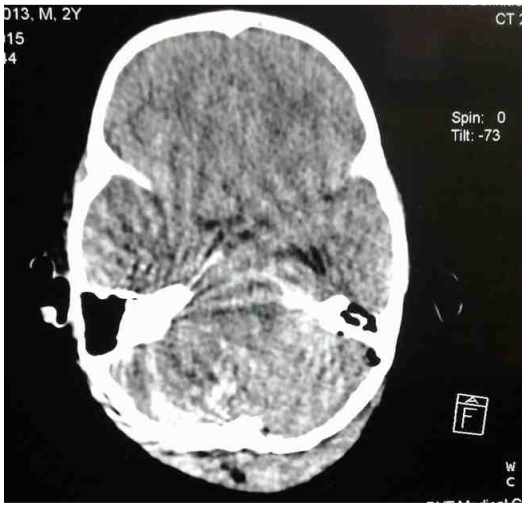


Figure 2 - CT head showing cerebellar hematoma with SDH

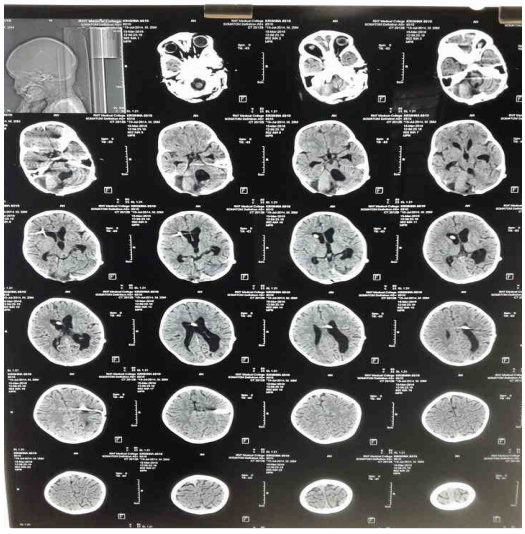


Figure 3 - Follow up CT head showing postoperative hydrocephalus

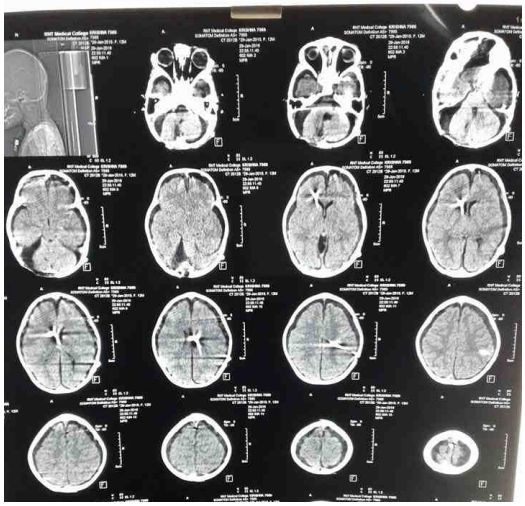


Figure 4 - CT head post VP shunt

Discussion

The scenario of a child presenting to the emergency departments with the history of trauma is common. Amongst these visits the incidence of head injury are the commonest. In the study of 2100 children under 13 years of

age or younger the most frequent kind of injury noted was head injury in 84.3% of cases. Out of 2100 patients 161 succumbed to the injuries and 145 out of 161 died because of head injury alone. (4) The modes of the injury are mostly fall, hit with heavy object, sports activity, road traffic accidents. Battered baby is a serious mode of injury and the clinicians should keep the possibility of this in mind on attending the child with polytrauma. While the traffic injuries are more common in western hemisphere the fall from height is still the leading cause of injury in our India. (5, 6) In the evaluation of 297 children in a series the incidence of head injury was found to be 22%. Fall from height accounted for 67% and road traffic accidents accounted for 24.4% of the injuries. (7) In India, children between 1 and 15 years from about 35% of the total population. (3) The presentation of the child may be widely varying in cases of head injury. The child may be in shock because of losing blood intracranially which is relatively uncommon in adult population. The cranial vault in children is not rigid so the relative rise in intracranial pressure may be less severe in children as compared with adults. The processes of evaluating a child with head injury are airway, breathing, circulation, disability evaluation, exposure and evaluation of other injuries and fluid resuscitation. The proper following of these steps is mandatory for successful and effective management of the patients.

It should be remembered that a child who seems to be normal may not have a score of 15/15. The best responses for the various ages have been summarised below (Table 3) and should be born in mind while assessing a child.

Table 2

Glasgow Coma Scale for children

Score	Response
Eye opening	
4	Spontaneous
3	To sound/speech
2	To pain
1	None
Verbal	
5	Appropriate for age
4	crying but consolable
3	Irritable/restless
2	Lethargic
1	None
Motor	
6	Spontaneous/obeys
5	Localises
4	Withdraws
3	Abnormal flexion
2	Abnormal extension
1	None

Table 3

Best age matched GCS score

Age	Best motor	Best verbal	Best overall
0-6 months	2 or 3	2	9
6-12 months	4	3	11
12-24 months	4	4	12
2-5 years	4 or 5	4	13
>5 years	5	5	14

Lack of physical signs can not specify that there is no intracranial pathology. (G) The difference among the clinical status and NCCT findings has also been noted. Sometimes it becomes difficult to correlate the NCCT findings with the clinical status of patients. (8, 9, 10)

The various manifestations of paediatric brain injury in children are EDH, Diffuse brain injury, brain contusions, depressed fractures and intraparenchymal hematoma. The various NCCT findings in paediatric patients from a series of AIIMS 3, Delhi (Table 4) are as follows:

Table 4

NCCT findings from a series of AIIMS, Delhi

Type of lesion	Number of patients
Extradural hematomas	15
Subdural hematomas	29
Cerebral contusions	85
Cerebral hematomas/ oedema	37
Diffuse axonal injury	14
Intraventricular haemorrhage	5
Brainstem hematoma	6
Cerebral infarction	8
Normal scan	31

The incidence of traumatic cerebellar hematomas in the adults is quite uncommon. Takeuchi et al reported in their series of 4315 patients 17 (0.4%) had cerebellar hematoma. (11) D. Avella et al reported and incidence of 0.54% (18/3290). (12) Sato et al reported in their series of 1176 patients 8 patients had cerebellar hematomas (0.7%). (13) The incidence of the traumatic cerebellar hematoma in children is relatively rare. This is usually followed by the direct occipital injury or as an associated manifestation of the countercoup injuries. Schneider et al reported four cases of cerebellar hematoma in children (14). Fisher reported 2 cases which were fatal for the patients. (15) Gurdijan reported two cases of such patients with traumatic cerebellar hematomas. (16) Wright et al (17) reported six cases. Tsai (18) reported 14 patients of cerebellar hematoma out of which 2 were child. The management depends upon the NCCT head abnormalities and the clinical condition of the patient. The CT scan is the first and most important investigation. It delineates the presence of the hematoma, size/location of hematoma, cisternal status, presence of hydrocephalus, presence of bone fractures and the status of the brainstem. MRI of brain is generally not needed because of good imaging with CT head. Zuccarello et al. reported five cases of cerebellar injury in their series of ten cases of traumatic posterior fossa haemorrhage in children. (19) The various possible mechanism of injury may be:

1. Occipital blow with occipital bone fracture with underlying cerebellar hematoma
2. Blow from front such as frontal blow and a countercoup injury
3. Acceleration-deceleration injury

The management as suggested initially by Buczek et al was that all intracerebellar hematomas should be evacuated. (20) Currently the opinions have shifted towards the conservative approach as suggested by the

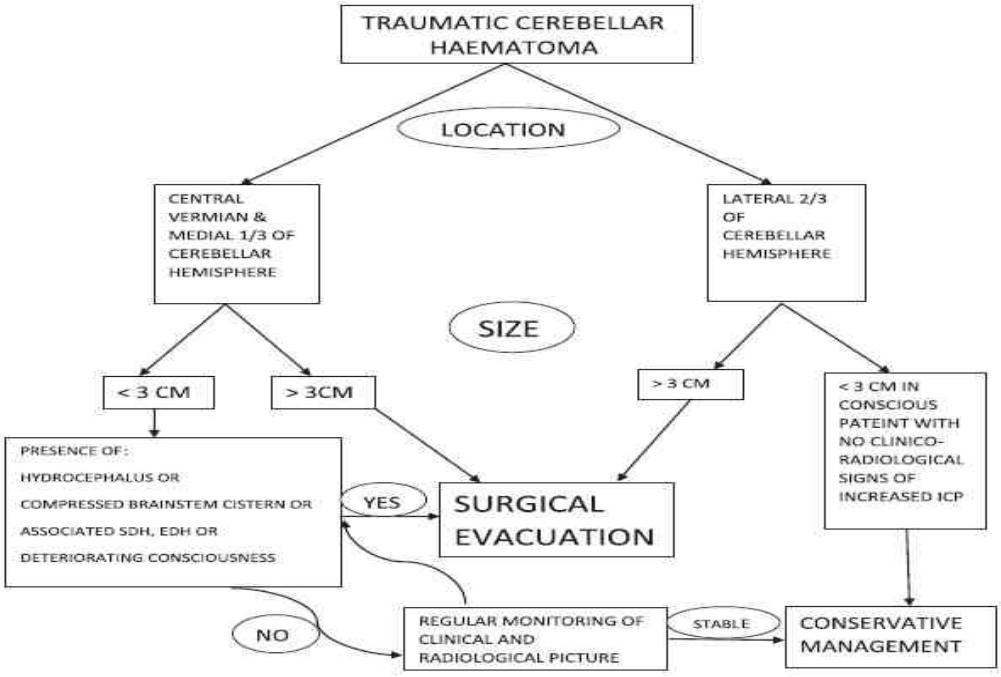
size of the hematoma, other associated findings, clinical status of the patients, absence of signs of raised intracranial pressure and the availability of the frequent CT scans facility. Treatment may be subdivided into two categories.

1. Conservative
2. Surgical

Conservative management is employed when the patient is fully conscious and the hematoma is superficially located and size is less than 3 cm or volume less than 15 ml. However these patients should always be followed up clinically and radiologically for the expanding hematomas, obstruction of 4th ventricle or basal cisterns.

Surgical management is employed in the patients with size of hematoma more than 3 cm, larger hematoma causing obstructive hydrocephalus and effacement of cisterns, associated subdural or extradural hematomas.

The above mentioned management may be outlined in the following algorithm.



Algorithm showing management of cerebellar hematoma

The outcome of these patients depends upon the various factors as outlined below. (20)

1. Initial GCS
2. Location of Hematoma
3. Associated Other Haemorrhages {EDH/ SDH}
4. Status of Ventricles and Cisterns
5. Hematoma Size and Volume
6. Presence of Subarachnoid Haemorrhage
7. Associated Supratentorial Lesions.

Conclusion

Traumatic cerebellar hematoma is rare in children. The management should be focused over these entities as they can be potentially life threatening in children. The conservative management should be undertaken carefully as the potential for the clinical deterioration is high and urgent evacuation is the key to successful management of these hematomas. However the standard treatment protocols need to be formulated.

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