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Case of the Month

"Pediatric chronic subdural hemorrhage: How minor is the minor head injury?"

ABSTRACT

We report a case of a 19-month old child who presented with a history of repeated hospital visits over the previous week with vomiting that was treated as gastroenteritis. She was having episodes of drowsiness on the day of presentation and a CT head, done as part of clinical evaluation, showed a large chronic subdural hemorrhage. Detailed review of history identified a minor head injury that had occurred about 2 months prior to presentation for which no hospital evaluation had been done. While the majority of minor head injuries in children are benign, and clinical decision rules assist in discharge of these patients, the potential space in the pediatric skull can accommodate a large volume of blood before clinical signs of head injury appear.

INTRODUCTION

This is an interesting case of a 19-month-old child who had been seen thrice in a week in other hospital facilities with recurrent vomiting. She had received an antiemetic injection and was discharged as a case of gastroenteritis. At index presentation, she had a head CT as part of her evaluation which showed a large chronic subdural bleed. Delving further into the history identified a history of a minor head trauma about 2 months prior. The child had been asymptomatic so a hospital visit was deemed unnecessary by the parents and she remained well until a week prior to presentation when she developed vomiting. Applying the pediatric head injury decision rule to the initial injury would likely have discharged the patient after a period of observation with head injury advice. This case highlights the potential of slow chronic bleed following a minor head injury due to the potential space in the pediatric cranium and the need for detailed history taking in aiding clinical evaluation.

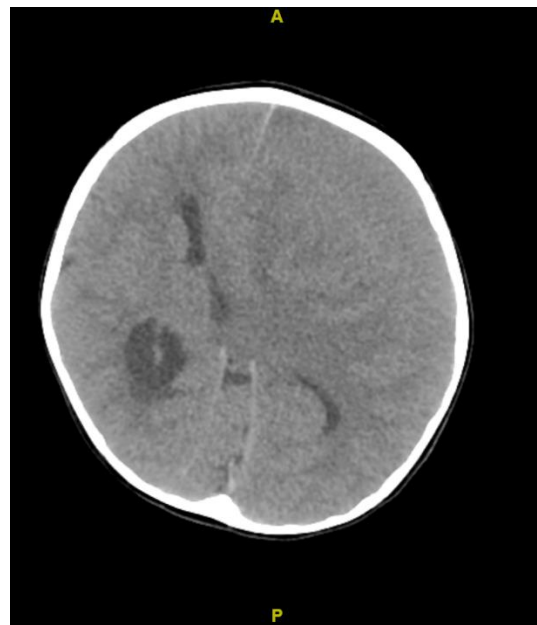
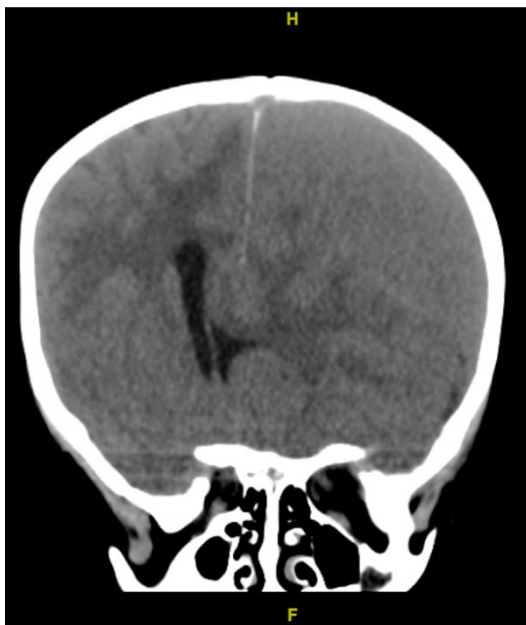
CLINICAL BACKGROUND

A 19-month-old female child was brought by her parents with a history of recurrent vomiting over the previous one week. She had been treated in a private medical facility with antiemetic and discharged. She had normal delivery with no significant past medical history or family history and had normal developmental milestones. However, she had presented again to another medical facility with persisting vomiting and was becoming drowsy. She was admitted and conservatively treated with antiemetic and intravenous fluids. While admitted, she was witnessed to have a short episode of seizure-like activity following which she underwent a head CT that showed an intracranial bleed. Thereafter, she was transferred to our facility.

Upon presentation to our hospital, further history was elicited and a history of minor head injury after a fall from a center table about 2 months prior was recovered. There was no loss of consciousness, no vomiting and no swelling to the head. The child had cried for a while at the time, but then settled so the parents had not thought it necessary to have a hospital visit. History for non-accidental injury was explored but there were no red flags or concerns for this. There was no history of hematological problems.

On examination, the patient had a GCS of 5/15 with a fixed dilated left pupil. She developed a generalized tonic-clonic seizure during evaluation that was aborted with 2 mg diazepam and she was intubated.

The plain head CT scan was reported as showing a large extra-axial hemorrhage of low density in the left fronto-parietal region with newly developed higher density hemorrhage in the posterior surface and lenticular shaped left frontal relatively cystic fluid. There was significant mass effect on the left cerebral hemisphere with brain edema. No skull fracture was seen.



She was transferred to the operating theatre by the neurosurgical team for an emergency craniotomy and evacuation of the hematoma as a life saving measure. Intraoperatively the patient was diagnosed to have a chronic subdural hematoma. Postoperatively, she had grade 2-3 hemiparesis in the left upper limb and 1-2 in the left lower limb, but otherwise she was stable. The patient was admitted for 14 days during which she underwent physiotherapy and was discharged on Phenytoin. She was reviewed in the clinic 5 days post-discharge and observed to be active and playing with normal gait.

DISCUSSION

Subdural hematoma refers to a collection of blood in the space between the dura and the arachnoid membrane. Classification is based on timing, with acute SDH occurring up to 48 hours, subacute SDH occurring up to 3 weeks, and chronic SDH occurring more than 3 weeks after the initial head trauma. In infancy, child abuse is a common cause of subdural hematoma.

The incidence of subdural hemorrhage in children less than 2 years approximates 13 per 100,000¹, with the majority arising from head trauma. Chronic SDH is characterized by membrane formation due to dural collagen synthesis and fibroblast activity, liquefaction of hematoma and hygroma formation, which may result in enlargement of collection¹. Further increase in size may occur from acute on chronic bleed and osmotic movement of water into protein rich hygroma¹. Minor head injury is the most common cause of chronic subdural hemorrhage^{2,3}.

Subdural bleed in minor head injury arises from disruption of bridging vessels in the subdural space and often exhibits little or no clinical signs as the hematoma grows to a large size. Lack of clinical signs is due to absence of direct brain trauma and slow accumulation of blood¹. In infants, the open fontanelle and cranial sutures provide potential space to tolerate an expanding hematoma. Hence, the diagnosis of chronic SDH in children can be quite challenging, due to its varied clinical presentation from non-specific symptoms of lethargy, irritability and vomiting to more alarming signs like altered mental status, seizures, apnea, breathing difficulty, or sudden cardiopulmonary arrest. Unless a child has predisposing risk factors such as bleeding tendencies, osteogenesis imperfecta, glutaric aciduria type 1 or rupture of arachnoid cyst¹, otherwise healthy and neurologically intact children would have low risk of developing SDH.

The Pediatric Emergency Care Applied Research Network (PECARN) criteria for head CT in children less than 2 years puts a <0.02% risk for clinically important traumatic brain injury in asymptomatic patients with minor head injury⁴. The absence of specific complaints and the lack of trauma history or evidence of abusive injury can be misleading or delay the diagnosis. One study of 33 infants with SDH showed that a diagnosis was reached after multiple admissions for lethargy and drowsiness⁵. In another case report, a 2 and half year old presented with complaints of vomiting after a slight head trauma due to a fall and was diagnosed three weeks later with bilateral SDH⁶.

The question arises that, in the absence of significant head injury in an otherwise healthy child, what would raise concern to guide imaging decision for earlier diagnosis of SDH in this age group? Clinical decision rules are available to guide imaging decisions but there remains a small risk of missed or delayed diagnosis of subdural bleeds. Detailed history taking in children presenting with non-specific symptoms and parent education and involvement in discharge plans may expedite diagnosis.

CONCLUSION

Chronic subdural bleed in children has an insidious onset with diagnosis further complicated by the often absence of adequate history. There should be a high index of suspicion for this in children presenting with non-specific symptoms and in-depth history should explore the possibility of undisclosed low-mechanism trauma.

The vast majority (95-97%) of children with minor head trauma have no imaging evidence of traumatic brain injury and classically, less than 1% of children with minor head trauma require neurosurgical intervention⁷. However, considering the fact that SDH has a poor prognosis and is relatively difficult to diagnose, it poses a challenge for clinicians as well as parents. Parents should be aware of what symptoms to look out for while clinicians should explore parents' recollection of any, albeit mild, prior head trauma in non-specific presentations. MRI and newly invented neuroimaging techniques may aid in the early diagnosis of a traumatic brain injury and reduce the radiation exposure of children in the CT scan. Research into pediatric head trauma may lead to advances in pediatric head trauma scoring systems to enable better identification of such cases in the future.

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