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Posterior Fossa Epidural Hematoma: A Case Report

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Introduction/Background: Posterior fossa epidural hematoma (PFEDH) is a rare entity within pediatric traumatic brain injury, characterized by blood accumulation between the dura mater and skull in the infratentorial compartment. Despite its low incidence, PFEDH carries significant risk due to the limited compliance of the posterior fossa, which may lead to brainstem compression, hydrocephalus, and rapid neurological deterioration. Clinical presentation is often subtle and nonspecific, contributing to delayed diagnosis and increased morbidity.

Case Presentation: A previously healthy 4-year-old girl presented with persistent vomiting following occipital head trauma after a fall. Initial evaluations misdiagnosed the condition as gastroenteritis, delaying neuroimaging. Progressive symptoms, including drowsiness and prostration, prompted cranial computed tomography, which revealed a posterior fossa epidural hematoma (4.3 × 3.0 × 1.8 cm) associated with ventriculomegaly and signs of intracranial hypertension. Despite a Glasgow Coma Scale score of 15 and absence of focal deficits, surgical intervention was indicated due to mass effect and cerebrospinal fluid obstruction. The patient underwent occipital craniotomy with hematoma evacuation. The postoperative course was uneventful, with rapid clinical improvement and complete recovery at follow-up.

Conclusions: PFEDH may present with nonspecific symptoms in pediatric patients, increasing the risk of diagnostic delay. This case highlights the importance of maintaining a high index of suspicion and early use of neuroimaging in children with persistent vomiting after head trauma. Prompt surgical management, even in neurologically stable patients, can lead to excellent outcomes and prevent severe complications.

Keywords: Hematoma, Posterior Fossa, Pediatric Neurosurgery

INTRODUCTION

Children are particularly susceptible to traumatic brain injury, such that traumatic brain injuries in the pediatric population constitute a global cause of mortality and long-term consequences, whether motor or cognitive [6].

Within the context of pediatric traumatic brain injuries, Posterior Fossa Epidural Hematoma (PFEDH) represents a rare clinical entity, due to the anatomical characteristics of the posterior fossa, which make it an unfavorable location for hematoma formation [2; 4]. PFEDH is defined as an extra-axial collection of blood in the potential space between the outer layer of the dura mater and the skull, most commonly resulting from head trauma, typically associated with impacts to the occipital region from falls from standing height (57.9%), and an initially paucisymptomatic neurological presentation, characterized by occipital pain, vomiting, and headache [1, 2, 4, 5, 9].

The severity of this condition lies in the potential for hematoma expansion, leading to brainstem compression, cerebellar tonsillar herniation, and obstruction of cerebrospinal fluid flow, complications that account for the rapid neurological deterioration observed in some cases [8]. The clinical presentation may be insidious, hindering early diagnosis and increasing the risk of delayed neurological deterioration [2]. Computed tomography (CT) is the gold standard for diagnosis, and delayed diagnosis is associated with high mortality rates [3, 7, 9].

When identified early, however, PFEDH tends to have a favorable course, particularly in pediatric patients, who traditionally exhibit better outcomes than adults [4]. Therapeutic management varies according to the clinical status at admission, although, in practice, neurosurgical intervention remains the most commonly adopted approach [9].

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Given the rarity and clinical complexity of this condition, the present article aims to report a case of posterior fossa epidural hematoma managed surgically in a young individual, contributing to the clinical and surgical discussion of this nosological entity.

CASE REPORT

A previously healthy 4-year-and-7-month-old female patient presented to an Urgent Care Unit with complaints of vomiting in the absence of abdominal pain. There was a history of occipital head trauma on the previous day, following a fall from standing height during recreational activity. Despite the antecedent traumatic event, the clinical presentation was initially managed as suspected acute gastroenteritis, and the patient received intravenous hydration, without undergoing imaging studies at that time.

The persistence of vomiting, associated with drowsiness, prostration, and mild frontal headache, prompted a second visit to the UPA, where the initial diagnostic hypothesis of gastroenteritis was maintained and the same therapeutic approach was adopted. On the subsequent day, in the context of marked somnolence, a cranial computed tomography (CT) scan was performed at a private service, revealing a posterior fossa epidural hematoma in the absence of associated skull fracture. The patient was then referred to the Emergency Department of a tertiary care hospital.

Upon admission, the patient was in good general condition, hemodynamically stable, well perfused, hydrated, acyanotic, anicteric, and afebrile. She was conscious and oriented, with a Glasgow Coma Scale score of 15, and without meningeal signs. No scalp hematomas were identified on palpation, and no focal motor deficits were observed. Vital signs revealed relative bradycardia for age (heart rate: 90 bpm) and systemic arterial hypertension (blood pressure: 120/83 mmHg), in the absence of respiratory distress (respiratory rate: 19 breaths per minute).

Laboratory evaluation, including platelet count, prothrombin time, and activated partial thromboplastin time, demonstrated no evidence of coagulopathy. A non-contrast cranial CT scan confirmed the presence of a right-sided posterior fossa epidural hematoma, with subacute characteristics, measuring 4.3 × 3.0 × 1.8 cm (estimated volume: 12 mL), without associated skull fractures or subgaleal hematoma. The lesion was associated with obstruction of cerebrospinal fluid flow, resulting in supratentorial ventriculomegaly and radiological signs suggestive of intracranial hypertension. Minimal laminar tentorial subdural hematomas were also identified (Figure 1).

Given the limited compliance of the posterior fossa and the imminent risk of cerebellar compression and brainstem compromise, surgical management was indicated, and the patient underwent craniotomy for hematoma evacuation.

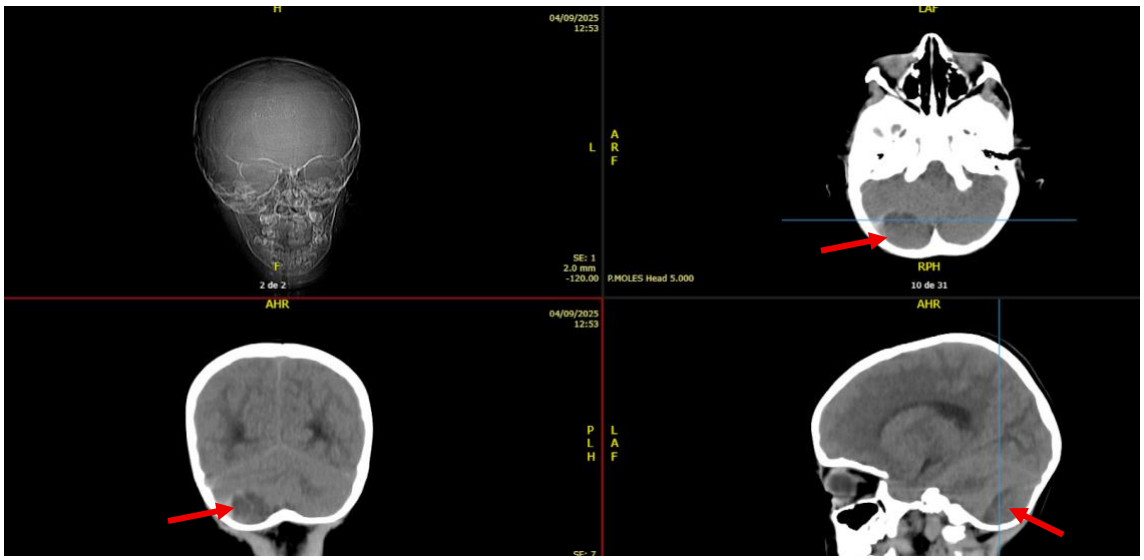

Figure 1. Computed tomography (CT) scan of the skull showing a right posterior fossa epidural hematoma (red arros), without bone fracture.

The patient was positioned in the supine position, with the head rotated to the left. A skin incision was performed in the right occipital region. Following soft tissue dissection and musculoperiosteal elevation, a small craniotomy was carried out over the right posterior fossa, allowing immediate evacuation of the

epidural hematoma. Intraoperative inspection revealed no active bleeding or intradural lesions. The surgical field was irrigated with 0.9% saline solution, and meticulous hemostasis was achieved. The dura mater was then anchored to the bony edges, and the bone flap was repositioned and secured. Layered closure was performed, and the procedure was concluded with the application of an occlusive dressing.

The postoperative course was uneventful. The patient remained in the pediatric intensive care unit, hemodynamically stable, without the need for continuous sedoanalgesia or respiratory support. On the following day, she was transferred to the general ward, and a non-contrast control cranial CT scan was obtained (Figure 2). Imaging demonstrated postoperative changes in the posterior fossa, including an occipital craniotomy with appropriately positioned bone flap, as well as evidence of successful evacuation of the epidural hematoma, reduction of mass effect, and resolution of ventriculomegaly. A small residual heterogeneous extra-axial collection on the right side was noted (Figure 2). The patient was discharged two days later.

Clinical follow-up at 2 weeks and 1 month was conducted, demonstrating full recovery. The patient had returned to her baseline functional status and resumed all usual activities, with no evidence of neurological sequelae. This case underscores the need for heightened clinical vigilance and highlights the importance of early recognition of subtle neurological signs in pediatric patients presenting with persistent vomiting following head trauma.

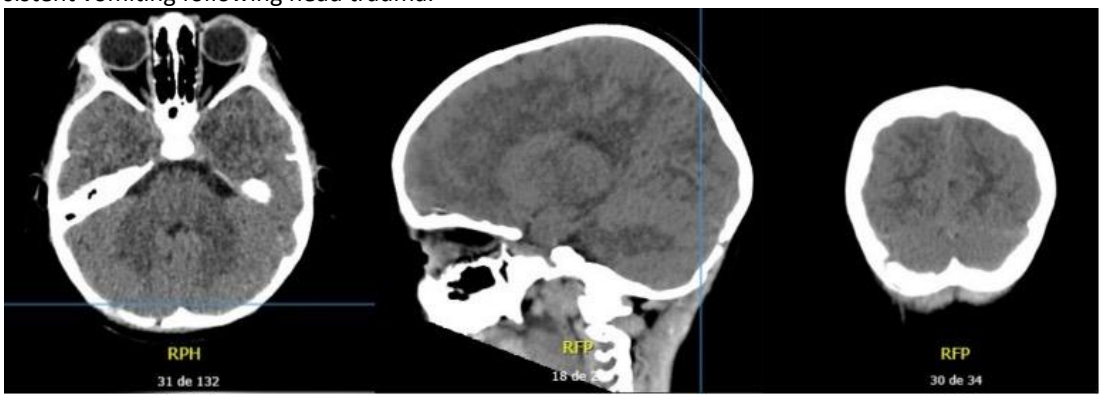

Figure 2. Postoperative brain computed tomography (CT) scans in different anatomical planes **(A):** Axial view **(B)** Coronal view **(C)** Sagittal view

Table 1. Case report timeline

Timepoint	
Day 0 (Trauma)	Occipital head trauma after a fall from standing height during recreational activity.
24 hours after trauma	First UPA visit due to persistent vomiting. Managed as suspected acute gastroenteritis with intravenous hydration. No neuroimaging performed.
48 hours after trauma	Persistence of vomiting associated with drowsiness, prostration, and mild frontal headache. Second UPA evaluation; gastroenteritis hypothesis maintained
72 hours after trauma	Progressive somnolence prompted cranial CT, which demonstrated posterior fossa epidural hematoma without skull fracture.
Hospital day 1	Admission to tertiary hospital. CT confirmed posterior fossa epidural hematoma with obstructive ventriculomegaly and signs of

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	intracranial hypertension. Urgent craniotomy indicated.
Surgical intervention	Right occipital craniotomy with evacuation of the epidural hematoma.
Postoperative day 1	Stable postoperative recovery. Control CT demonstrated successful hematoma evacuation and resolution of ventriculomegaly.
Postoperative day 3	Hospital discharge without neurological deficits.
2-week follow-up	No neurological abnormalities identified.
1-month follow-up	Complete functional recovery without neurological sequelae.

UPA = Unidade de Pronto Atendimento (Urgent Care Unit); CT = computed tomography. Timepoints are presented relative to the traumatic event and subsequent hospitalization. Clinical information was obtained from medical records, imaging studies, surgical reports, and outpatient follow-up evaluations.

DISCUSSION

Posterior fossa epidural hematoma (PFEDH) represents a rare clinical entity within the spectrum of pediatric traumatic brain injury, accounting for only a small fraction of intracranial epidural hematomas. Its low incidence is primarily related to the anatomical characteristics of the posterior fossa, including the firm adherence of the dura mater to the occipital bone and the lower frequency of significant vascular injury in this region [1,4,8]. Nevertheless, when present, PFEDH carries substantial clinical relevance due to the limited compliance of the infratentorial compartment, where even small volumes of blood may produce disproportionate mass effect, with risk of brainstem compression, cerebellar tonsillar herniation, and obstruction of cerebrospinal fluid (CSF) flow, leading to obstructive hydrocephalus and rapid neurological deterioration [8,9].

In the pediatric population, PFEDH exhibits distinct clinical features. Unlike adults, children often present with an initially paucisymptomatic and nonspecific clinical picture, characterized by symptoms such as vomiting, headache, drowsiness, and mild occipital pain, frequently in the absence of focal neurological deficits [1–5]. This insidious presentation significantly contributes to diagnostic delays, particularly when symptoms are misinterpreted as gastrointestinal or infectious conditions, as observed in the present case. Such scenarios reflect a common cognitive bias in clinical practice, wherein the absence of objective neurological findings lowers suspicion for intracranial injury, delaying neuroimaging and increasing the risk of late neurological deterioration [2,5].

Cranial computed tomography (CT) remains the diagnostic modality of choice and is essential for the early identification of PFEDH, assessment of mass effect, detection of hydrocephalus, and recognition of indirect signs of intracranial hypertension [9]. In the present case, CT imaging demonstrated not only the posterior fossa epidural hematoma but also supratentorial ventriculomegaly, indicating significant pathophysiological impact on CSF dynamics. These findings underscore the potential severity of this condition, even in the absence of focal neurological deficits on initial clinical examination, corroborating evidence from the literature indicating that clinical deterioration may occur abruptly and unpredictably [8,9].

The optimal therapeutic approach to PFEDH remains a matter of ongoing debate. Although conservative management has been described in selected cases—particularly in neurologically stable patients with small hematomas, no significant mass effect, and no hydrocephalus—the majority of studies support early surgical intervention as the safest strategy, especially in pediatric patients [3,4,9]. The low compliance of the posterior fossa, combined with the risk of sudden deterioration, favors a more aggressive approach, prioritizing early decompression to prevent severe neurological complications.

In the present case, the decision to proceed with surgical management was based on objective criteria, including the presence of mass effect, obstruction of CSF flow, ventriculomegaly, and indirect signs of intracranial hypertension, despite a preserved Glasgow Coma Scale score at presentation.

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Occipital craniotomy with evacuation of the extradural hematoma resulted in rapid reversal of mass effect, restoration of CSF dynamics, and favorable clinical evolution, without neurological deficits on follow-up. This outcome is consistent with studies demonstrating that early diagnosis and timely intervention in pediatric patients are associated with favorable prognosis and low rates of neurological sequelae [2–4,9].

Beyond the technical-surgical aspects, this case highlights a critical point in clinical practice: the importance of maintaining a high index of neurological suspicion in children presenting with persistent vomiting following head trauma, even when the initial neurological examination is unremarkable. In pediatric patients, the absence of focal deficits does not exclude significant intracranial injury, particularly in high-risk anatomical regions such as the posterior fossa. Therefore, the indication for neuroimaging should be liberal in the presence of head trauma associated with persistent nonspecific neurological symptoms, such as vomiting and drowsiness, in order to prevent potentially fatal diagnostic delays [2,6].

Thus, the present report contributes to the literature by illustrating not only the clinical presentation and surgical management of PFEDH but also the risks associated with initial underdiagnosis, reinforcing the need for more sensitive evaluation protocols in pediatric head trauma and greater awareness of rare yet clinically significant entities such as posterior fossa epidural hematoma.

CONCLUSION

In the context of pediatric traumatic brain injury, Posterior Fossa Epidural Hematoma represents a rare clinical entity with an insidious onset and potentially severe course. The present case report demonstrates that paucisymptomatic presentations, characterized by nonspecific and persistent symptoms such as vomiting and drowsiness following head trauma, should be carefully valued, even in the initial absence of focal neurological deficits.

Early surgical management resulted in a favorable clinical outcome, with complete resolution of the condition and no neurological sequelae. This surgical decision and subsequent evolution are consistent with the literature, which indicates better prognoses in pediatric patients when diagnosis and intervention are performed in a timely manner.

Thus, the present case contributes to the literature by reinforcing the pivotal importance of neurological surveillance and prompt diagnosis in the appropriate management of this pathology, highlighting that the absence of focal neurological signs does not exclude the presence of a severe intracranial lesion. The dissemination of such knowledge within the medical community is of paramount importance in order to reduce diagnostic delays and prevent potentially fatal outcomes in this population.

DISCLOSURES

Ethical approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the local Ethics Committee Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da USP, number: 96364526.7.0000.5440

Consent to participate

The patients gave consent to use their information and images for research purposes. *Consent for publication*

The patient gave consent to use his information and images for publication.

Conflict of interest

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper

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Artificial intelligence

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CONTRIBUTIONS

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Ruan Krubniki Ferraz: Writing-Review and Editing, Formal analysis
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