

CASE REPORT

Traumatic retroclival epidural hematoma in a child

Hematoma epidural retroclival traumático en un niño

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Abstract

Posterior fossa epidural hematomas are seldom encountered and vaguely understood. In this paper, we report on a 10-year-old child experiencing a traumatic retroclival epidural hematoma. A 10-year old boy was involved in a car-to-motorcycle accident. On admission, level of consciousness was assessed 11 on Glasgow Coma Scale. Brain computed tomography revealed a hyperdense lesion in favor of epidural retroclival hematoma mildly compressing the pons. The epidural retroclival hematoma was managed conservatively with close clinical observation. The level of consciousness improved after 8 hours. The patient then complained of headache; however, they had no sign or symptoms of neurologic deficits. Eventually, a repeat CT-Scan was obtained before discharge on day 6, which demonstrated partial resolution of the hemorrhage. Three and nine months later, follow-up physical examinations and CT-Scans demonstrated no new neurological deficits and revealed gradual resolution of the hematoma. Our observations that conservative treatment with close clinical monitoring and serial recording of CT-Scans are the mainstay of management are not new but agree with earlier studies.

Key words: Hematoma, epidural, cranial, intracranial hemorrhages, conservative treatment, consciousness, automobiles.

Resumen

Los hematomas epidurales de la fosa posterior son raros y poco conocidos. En este artículo, informamos sobre un niño de 10 años que sufrió un hematoma epidural retroclival traumático después de un accidente de tráfico. Al ingreso, el nivel de conciencia se evaluó en 11 en la escala de Glasgow. La Tomografía Computarizada (TC) cerebral reveló una lesión hiperdensa compatible con un hematoma retroclival epidural que comprimía ligeramente el puente de Varolio. El hematoma retroclival epidural se trató de forma conservadora con una estrecha observación clínica. El nivel de conciencia mejoró después de 8 horas. El paciente se quejó de dolor de cabeza; sin embargo, no tenía signos o síntomas de déficit neurológico. Finalmente, se repitió la tomografía computarizada antes del alta el día 6, que demostró la resolución parcial de la hemorragia. Tres y nueve meses más tarde, los exámenes físicos de seguimiento y las TC no demostraron nuevos déficits neurológicos y revelaron una resolución gradual del hematoma. El hecho de que el tratamiento conservador con un estrecho control clínico y el registro en serie de las TC son el pilar del tratamiento no es nuevo, pero coinciden con estudios anteriores.

Palabras clave: Hematoma, epidural, craneal, hemorragias intracraneales, tratamiento conservador, conciencia, automóviles

Introduction

Posterior fossa epidural hematomas are seldom encountered. Interestingly, retroclival hemorrhages are among the rarest, comprising an estimated 1.2% to 12.9% of all epidural hematomas^{1,2}. The pediatric population, aged between 3 to 16 years, is involved in high-speed vehicle accidents that are mostly affected^{1,3}.

Retroclival hematomas are a rare entity that is still vaguely understood. Traumatic events inducing neck hypermobility, i.e., hyperflexion and hyperextension, are predominantly responsible for retroclival hematomas. Both mechanisms may lead to soft tissue injuries or fractures and, therefore, venous bleeding⁴. Retroclival hemorrhage may be classified into epidural hematoma [RcEDH] or subdural hematoma [RcSDH] according to the tectorial membrane⁵.

The predominance of the condition among children aged between 3-16 years is mainly attributable to the craniocervical junction's unique anatomical features, which is mostly attributable to the craniocervical instability junction due to smaller occipital condyles and the more horizontal positioning of the atlantooccipital joint¹.

The craniocervical junction is a lax ligamentous apparatus providing mobility at the expense of stability^{5,7}. According to previous studies, atlantooccipital dislocation^{11,12}, atlantoaxial dislocation², rupture of the transverse ligament⁶, fractures of the occipital condyles¹³, spheno-occipital synchondrosis diastasis¹⁴, brain stem contusion, and intraventricular hemorrhage may be connected to the condition⁶.

Clinical manifestations

Retroclival hematomas may present with highly variable clinical symptoms, including nausea, headache, and cranial nerve palsies¹⁵. The sixth cranial nerve [i.e., Abducens] is the most commonly affected cranial nerve, which may be injured both unilaterally^{10,16} or bilaterally^{3,9,11,17-21}. Neurological impairment may be related to stretching, direct compression, or contusion of surrounding nerves and brain parenchyma. The optic, oculomotor, trigeminal, facial, glossopharyngeal, and hypoglossal nerves may also be injured. Patients may also manifest paresis or palsies of upper and lower extremities^{2,15}. Brain stem contusion with cardiorespiratory failure^{6,8,11,12,22} and progressive hydrocephalus¹¹ may infrequently occur in severe cases¹⁵.

Diagnosis and management

REDHs are frequently misdiagnosed; CT-Scans may initially appear normal or mislead the practitioner due

to the cranium's artifacts. Consequently, in high clinical suspicion MRI, it is crucial to demonstrate the disease entity's anatomical details and discover injury of the ligamentous apparatus⁸.

Common etiologies, including trauma and pituitary adenomas, can usually be established by comprehensive history taking. If no obvious mechanism is found, work-up for vascular or coagulation abnormalities must be undertaken²³.

Considering previous literature, most cases of REDH manifest a benign clinical course and resolve spontaneously within 2-11 weeks. Therefore, conservative treatment with close clinical observation and serial recording of CT-Scans are the mainstay of management⁴.

Illustrative case

A 10-year old boy was involved in a car-to-motorcycle accident. On admission, the patient suffered from nausea and vomiting. The patient was lethargic and confused on examination. Level of consciousness was assessed 11 [E₃V₃M₅] according to the Glasgow Coma Scale. The patient was hemodynamically stable with a BP=100/60 and PR=100. No focal neurologic findings, cranial nerve palsies, or clinical deterioration due to cerebral/brain stem contusion was observed. The pupils were bilaterally reactive to light and measured 3 mm.

As shown in **figure 1**, axial brain computed tomography revealed a 58 mm long hyperdense lesion with a maximum thickness of 4.3 mm extending from the superior posterior aspect of the clivus to the central posterior aspect of the odontoid in favor of epidural retroclival hematoma mildly compressing the pons. The spheno-occipital suture showed no evidence of fracture. As shown in **figure 1** (white arrow), the ossiculum terminal of the C2 odontoid process was seen that fused to the dens in follow-up imaging studies as part of a physiologic process typically seen at the age of 12. As shown in **figure 2**, subarachnoid blood was also noted in the basal cistern and left cerebellopontine angle, indicating subarachnoid hemorrhage. Brain CT-Angiography revealed no pathologic findings. It must be emphasized that cervical CT-Scan demonstrated no evidence of retropharyngeal hematoma, atlanto-occipital instability, or atlantoaxial dislocation.

The patient was transferred from the ED to the orthopedic ward due to a subtrochanteric fracture of the left femur managed subsequently by ORIF Surgery. No critical care was required. The epidural retroclival hematoma was managed conservatively. The level of consciousness improved after 8 hours, measuring 15 on Glasgow Coma Scale. Complaints of a headache and left hip and thigh pain were noted during the reassessment of the

patient. Physical examination revealed no cervical spine tenderness or cranial nerve deficits. The patient was hospitalized for 6 days. Eventually, a repeat CT-Scan was obtained before discharge on day 6, which demonstrated partial resolution of the hemorrhage.

Follow-up: Three months later, follow-up physical examination was unremarkable, and repeat CT-scan showed gradual resolution of the hematoma from the basion to the posterior aspect of the C2 body, declining to a maximum thickness of 4.0 mm and a length of 27mm

as can be seen from **figure 3**. A follow-up CT-Scan nine months later, as shown in **figure 4**, demonstrated no evidence of the hematoma in the retroviral region. In the retro-odontoid region, a hyperdensity with a maximum thickness of 3.4 mm was found.

Outcome: According to previous studies, partial recovery with minimal residual neurologic deficits was reported as the most common outcome^{2,8}; however, our case regained consciousness and demonstrated complete resolution of symptoms on the first day of admission.

Figure 1: Craniocervical CT Scan, sagittal view, in the first admission; illustrate ossiculum terminate and thickness of RCEDH.



Figure 2: Brain CT Scan ,Axial view. Shows subarachnoid hemorrhage in Basal and left CPA cisterns.

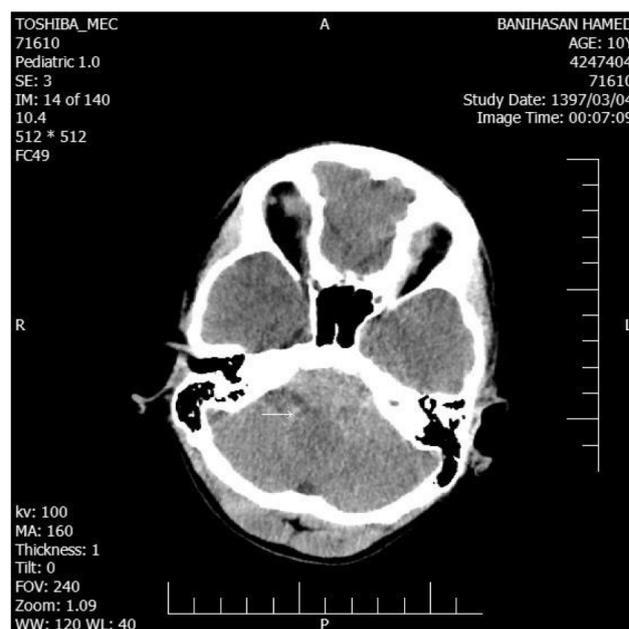


Figure 3: Craniocervical CT Scan, sagittal view, illustrate thickness of RCEDH that decreased after 3 month.



Figure 4: Craniocervical CT Scan, sagittal view, RCEDH resolved and only retro-odontoid hematoma remains after 9month.



The findings of a clinical series conducted by Tubbs et al. [39] are in good agreement with the case presented in our study; No correlation was revealed between hematoma sizes and clinical manifestations or initial GCS scores and clinical outcomes. [17, 22, 2]. The extra-axial hematoma may pressure the brainstem and cranial nerves, warranting surgical evacuation^{11,21,24,25}.

Conclusion

Retroclival hematomas are a rare entity still vaguely understood, usually manifesting with variable clinical

symptoms. Our observations that close clinical observation and serial recording of CT-Scans are the mainstays of management are not new but are in good agreement with earlier studies.

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