LATIN Neurosurgery

Case Report

Vertex epidural hematoma. Case report and literature review

Hematoma epidural de vértice. Reporte de caso y revisión de la literatura

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ABSTRACT

Introduction: *The vertex epidural hematoma (VEH) is considered an infrequent post-traumatic extradural blood collection, formed by rupture of the superior sagittal sinus (SSS) and venous gaps, with an incidence of 0 to 8%.* **Objective:** *to present a VEH case, associated with a literature review.* **Case presentation:** *The patient presented with cervical pain, associated with falling from a motorcycle without wearing a helmet, admission Glasgow coma scale of 12, lower limbs paresis, and muscle strength grade 3 in the lower limbs. The skull computerized tomography (CT) evidenced extensive biparietal epidural hematoma, associated with bilateral motor cortex compression. He was submitted to the right parietal osteoplastic craniotomy with left extension, associated with blood clot drainage and small laceration suture in the SSS middle portion. Patient was discharged with no evident neurological deficit.* **Conclusion:** *The vertex epidural hematoma is an uncommon condition among cases of epidural hematoma. Its early diagnosis, performed mainly by axial CT and the appropriate treatment, has good results.*

Keywords: *epidural hematoma; neuroimaging; vertex.*

RESUMEN

Introducción: *El hematoma epidural de vértice (HEV) se considera una colección sanguínea extradural postraumática infrecuente, formada por ruptura del seno sagital superior (SSS) y brechas venosas, con una incidencia de 0 a 8%.* **Objetivo:** *Presentación de un caso de HEV, asociado a una revisión de la literatura.* **Reporte del caso:** *El paciente presentó dolor cervical, asociado a caída de una motocicleta sin usar casco, ingresó en la escala de coma de Glasgow de 12, paresia de miembros inferiores y fuerza muscular grado 3 en los miembros inferiores. La tomografía computarizada (TC) de cráneo evidenció un extenso hematoma epidural biparietal, asociado a compresión de la corteza motora bilateralmente. Siendo sometido a craneotomía osteoplástica parietal derecha con extensión a la izquierda, asociada a drenaje de coágulo sanguíneo y pequeña sutura de laceración en la porción media del SSS. Siendo dado de alta sin déficit neurológico evidente.* **Conclusión:** *El hematoma epidural de vértice es una condición poco común entre los casos de hematoma epidural. Su diagnóstico precoz, realizado principalmente mediante TC axial, y el tratamiento adecuado ofrecen buenos resultados.*

Palabras clave: *hematoma epidural; neuroimagen; vértice.*

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1 INTRODUCTION

Epidural hematomas are defined as the blood accumulation between the dura mater and the skullcap[1], often occurring in the lateral convexities of the skullcap, commonly resulting from rupture of the middle meningeal artery[2]. The vertex epidural hematoma (VEH) is onsidered an infrequent extradural blood collection[3,4], posttraumatic[5], formed by rupture of the superior sagittal sinus (SSS) and venous lacunae[6], and presenting an incidence of 0% to 8%[7]. Being diagnosed through acute, subacute, chronic or late symptoms[1,2]. It may be unnoticed in cranial computed tomography (CT) due to its location[5], being necessary caution during the analysis of the blood collection when in axial view[8]. This entity presents 50% of mortality, when not diagnosed[9].

This paper aims to report a case of VEH, associated with a literature review, highlighting the importance of the correct diagnosis and management from its pathophysiology to its treatment.

2 METHODS

The literature review was carried out according to the Preferred Reporting Items for Systematic reviews and Meta-analyzes (Prisma), added to the illustration of a case report of epidural hematoma in the cranial vertex.

A systematic literature review was developed through data collection on PubMed, ScienceDirect, SciELO, LILACS and TripDataBase databases. Based on keywords from the Health Sciences Descriptor (DeCS/MeSH), the following search term was used "Epidural Hematoma" AND "Vertex", totaling 357 scientific papers, the last dated on 07/31/2020, for title and abstract analysis. As inclusion criteria, articles published in English and Portuguese were selected, on Hematoma Epidural Vertex pathology in individuals belonging to any age group. As exclusion criteria, there were studies that reported unrelated pathologies, not developed in human beings, systematic reviews, meta-analyses, letters to the editor and published in databases with no abstract. Finally, 84 articles were excluded, leaving 20 articles for analysis of the full text belonging to the time frame from 1983 to 2020.

3 CASE PRESENTATION

Male patient, 30 years old, student. He presented to the emergency department of the Hospital de Emergência de Sergipe, eupneic, stained mucous membranes, referring to cervical pain, associated with falling from a motorcycle without wearing a helmet. On neurological examination, he was drowsy, with Glasgow coma scale at admission of 12, associated with isochoric and photoreactive pupils, paresis of the lower limbs, and muscle strength in the lower limbs of grade 3. Cervical spine CT was normal. Skull CT without contrast showed extensive biparietal epidural hematoma, associated with bilateral compression of the motor cortex (Figures 1 and 2). The patient underwent a right parietal osteoplastic craniotomy with left extension, with an extensive fracture trace in the middle portion of the bilateral parietal bone. The blood clot was drained, with identification of a small laceration in the middle portion of the SSS, sutured with mononylon 4-0, and using of local Surgicel®. The patient was discharged with no evident neurological deficit.

4 DISCUSSION

Epidemiology

VEH constitutes a small percentage of all epidural hematomas, between 1% and 8%[8]. From 92% to 100% of VEHs are originated from vertex fracture or rupture of the SSS[7].

Physiopathology

As the VEH is formed from the rupture of the SSS and venous lacunae, its presence compromises the absorption of cerebrospinal fluid[4], leading to the development of a symptom of elevated intracranial pressure (ICP)[6], especially when the hematoma is located more posteriorly in relation to SSS, if arachnoid granulations present clots, hydrocephalus[7] may occur. The increase in ICP leads to downward movement of the brain, stretching the sixth cranial nerve pair against the petrous crest, causing the paralysis of this innervation[8]. The hematoma may compromise the post-central cortex, generating motor weakness[6]. The sources of VEH can be meningeal veins, the sinuses of the dura mater, diploic space[7] and middle meningeal artery[10], with the formation of hematoma due to rupture of SSS being rare, through the highlight of the dura mater or bone fragment fracture[9],

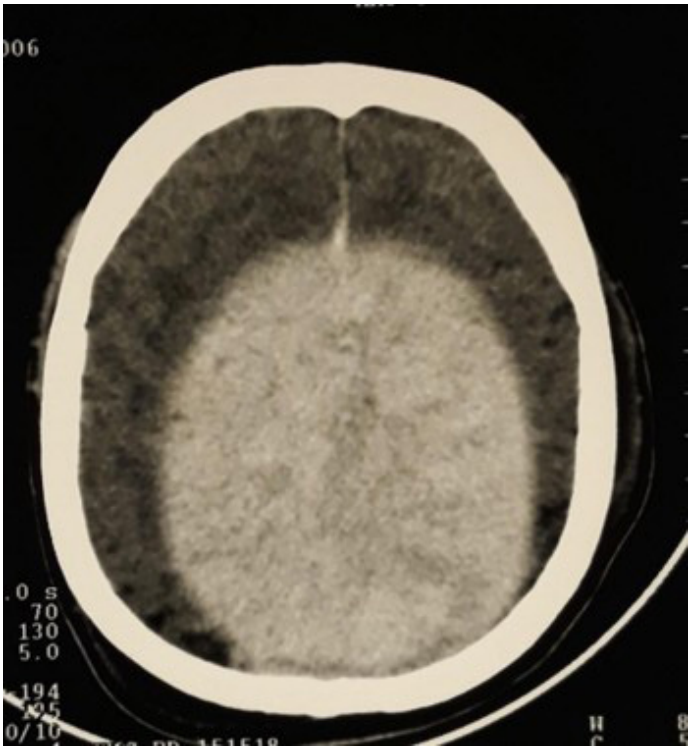
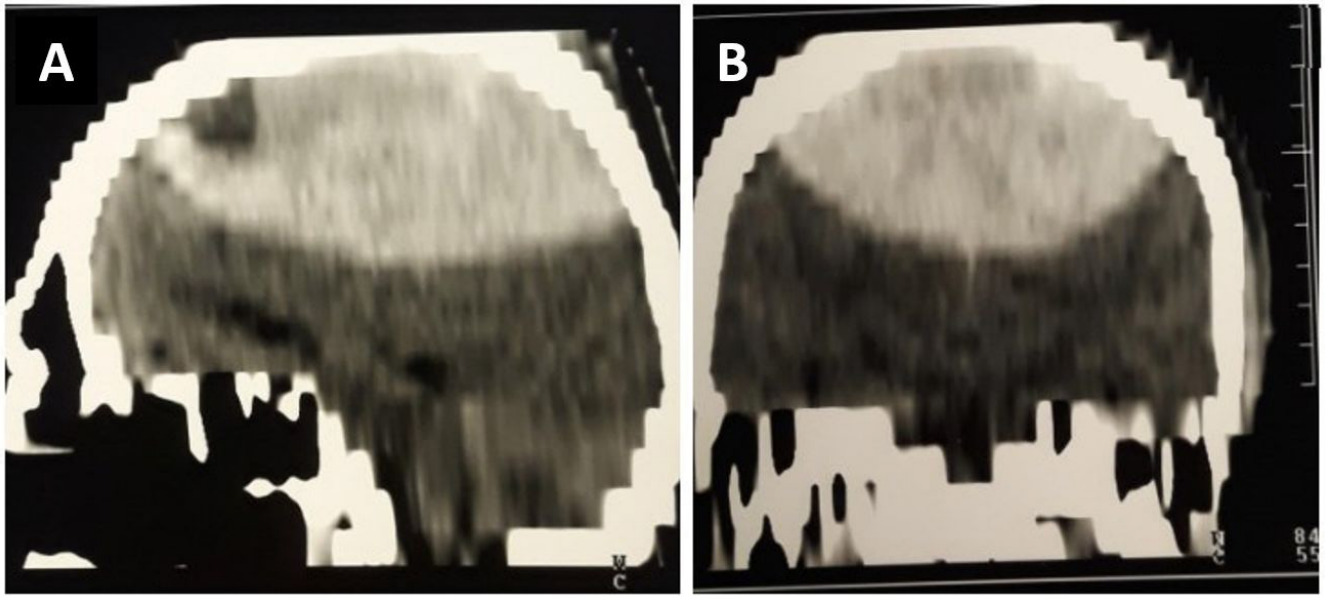


Figure 1. Non-contrast skull CT showing an extensive hyperdense area in the biparietal region, compatible with the epidural hematoma of the vertex.

however for VEH it is considered frequent[8]. Harbury et al.[11] in a study with 4 patients showed that the bleedings were originated from rupture of dural veins, diploic space, SSS and emissary veins. The formation of epidural hematoma by venous vessels is slow[12], which can cause the late formation of this blood collection. Steward et al.[13] presented a patient who suffered a high voltage electrical injury (12,000 volts), in which he developed an HEV after 2 weeks of the event, and it was hypothesized that the SSS was damaged due to electrical current.

Sintomatology

Differently from epidural hematomas located in temporal or parietal regions, the clinical manifestation will rarely present in an acute form[14]. Sometimes it characterizes a non-specific clinical syndrome, non-localized[6] and not lateralized[15]. As it does not present focal deficits, it may present a late diagnosis[7]. VEH manifests itself through headache, papilledema[4], vomiting, hyperactive deep tendon reflexes[6], drowsiness, mental confusion[7], diplopia[8], vertigo[14], encephalopathy, depression of level of consciousness, paraparesis[11], and hemiparesis[10]. Lesions with parasagittal location can develop symptoms such as generalized seizures, hemiplegia or crural paraplegia and urinary incontinence[16].



Figures 2. (A) CT without contrast after reconstruction in sagittal section showing extensive hyperdense lesion and cerebral compression; (B) Coronal non-contrast CT after reconstruction showing hyperdense lesion with compression of the cerebral cortex in the middle and posterior biparietal region.

Kiboi and Muriithi[17] presented a case in which the patient presented decerebration posture in the upper limb associated with VEH. In a study with 29 patients, Ramesh et al.[5], showed that all patients had headache, papilledema in 5, and unilateral weakness of the lower limb in 5 patients. Borzone et al.[18] presented a series with 11 patients, and 9 had a symptom-free interval after the traumatic event, 3 cases with symptoms of stiffness associated with discoloration, 2 individuals with anisocoria, 2 with bilateral miosis, and 1 patient with bilateral mydriasis - the only one who presented headache. In the present case report, the patient presented cervical pain, associated with falling from a motorcycle without wearing a helmet, Glasgow coma scale at admission of 12, paresis of the lower limbs, and muscle strength in the lower limbs of grade 3.

Diagnosis

Before the establishment of the CT test, VEH was diagnosed using only an angiography in the venous phase[1]. Skull radiography may show fracture of the skull vertex and cranial sutures diastasis, such as coronal suture or sagittal[2,5,18,19]. VEH may not be identified on cranial CT, being considered a "blind spot", and may be interpreted as an artifact or not identified in axial sections, indicating the visualization of CT in coronal section, reconstruction of the plans for coronal section or analysis of the sagittal view[1,2,9,14]. Ramesh et al.[5] presented a vertex fracture crossing the midline, vague density in the axial views and diastasis of the coronal suture, CT findings. The difficulty in diagnosing VEH through cranial CT is due to the isodensity close to the adjacent cranial cap, alignment of the hematoma along the image plane, and CT slices with a thickness greater than that of VEH[11]. Brain magnetic resonance is the best imaging modality for the diagnosis of VEH, with differential diagnosis of parasagittal meningioma, dural lymphoma, plasmacytoma and hyperostosis[8,20]. The patient in this article underwent cranial CT without contrast evidencing extensive biparietal epidural hematoma associated with compression of the motor cortex bilaterally.

Treatment

The treatment varies according to the size of the VEH and the symptoms manifested by the patient, and can be conservative or surgical[8]. Ramesh et al.[5], in a study with 29 patients, treated 24 conservatively, and 5 presented deterioration of the mental state or increased clot, and 4 patients underwent VEH drainage. The treatment of chronic VEH is similar to acute, involving the decision of conservative or surgical intervention[14]. Our patient underwent left parietal osteoplastic craniotomy with left extension, associated with drainage of the blood clot and a small laceration suture in the medium portion of the SSS.

Complications

The high mortality of acute or chronic VEH is associated with its deleterious action on the central nervous system as a result of non-diagnosis[14], which is important to limit the individual rates of morbidity and mortality[11]. Our patient was discharged with no evident neurological deficit.

5 CONCLUSION

Vertex epidural hematoma is an uncommon condition among epidural hematoma cases. Its early diagnosis, mainly performed using CT in the axial view and the appropriate treatment, has good results.

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