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Vertex extradural hematomas: when to operate?: A case report

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ABSTRACT

Background: Vertex extradural hematomas (VEDHs) are a rare consequence of head injury which represent another distinct group of EDHs. They may present with unusual clinical signs that can delay diagnosis and offer a dilemma as to indication for and timing of surgery.
Aim: This case report aims to report a prompt decision to operate a patient with VED.
Case Report: A man with VEDHs was referred to our institution due to neurological deterioration and worsening symptoms after conservative treatment. An emergency craniotomy was conducted to the patient. Post-operatively, the patient made a good clinical improvement.
Conclusion: A prompt decision to surgery is vital for a good outcome of the patient with VEDHs.

Keyword: vertex, extradural hematoma
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INTRODUCTION

Vertex extradural hematomas (VEDHs) are EDHs occurring in the quadrangular area of the skull, bounded anteriorly by bregma and coronal sutures, posteriorly by lambda and lambdoid suture, laterally by the parietal eminence.[1] Some cases of VEDHs extended beyond the anatomical confines of the vertex.[1] The source of this EDH is a tear in the superior sagittal sinus (SSS), which is the most frequent source; bleeding from the fracture line itself; dural stripping from the inner table of the skull; bleeding from the diseased vascular skull bone, as in Paget's disease; an arterio-venous fistula of meningeal artery created by a laceration of dura underlying a linear skull fracture; rebleeding in chronic cases; and spontaneous VEDHs also have been reported.[1,2] VEDHs are a rare consequence of head injury.[3,4] They represent another distinct group of EDHs.[3] VEDHs account for 0.024% of all head injuries and 0.47-8.20% of all intracranial extradural hematomas.[1-5] VEDHs should be considered a special clinical entity because of its presentation and underlying vascular etiology.[4] They may present with unusual clinical signs that can delay diagnosis and present a dilemma as to indication for and timing of surgery.[4] A prompt decision to surgery is vital for good outcome because if left untreated, VEDHs could contribute to 18-50% of mortality rate.[3]

CASE REPORT

An 18-year-old man was referred from the periphery hospital to the emergency room of our institution with decreased of consciousness after falling from two meters height two days before admission. He was also presented with retrograde amnesia and headache. At the previous hospital, brain Computed Tomography (CT) scan was not conducted since the first day because his only symptom was mild headache (VAS 1) and his Glasgow Coma Scale (GCS) score was 15. After being treated conservatively for one day, his headache persists and became worsening. He had decreased of consciousness with GCS score became 12 (E3V4M5). Then, the CT Scan was conducted and VEDH was found (Figure 1 and Figure 2).

The medical team performed an emergency craniotomy to the patient. The patient was positioned supine and 30 degrees head up. The burr holes were placed above the SSS and laterally to include the margins of the hematoma. Intraoperatively, the team found diastasis fracture of the sagittal and coronal suture with a tear of the SSS as the source of the bleeding. On the immediate postoperative day, the patient made good improvement with GCS score 15 and asymptomatic. The patient was discharged from the hospital on day 4.

DISCUSSION

The onset of VEDHs is not always acute. It also can be subacute (6 hours-7 days) or even chronic (>7 days), and can be significantly delayed.[3,5] The diagnosis of VEDHs may be postponed because of the nonspecific symptoms and clinical findings. Signs and symptoms are variable and appear

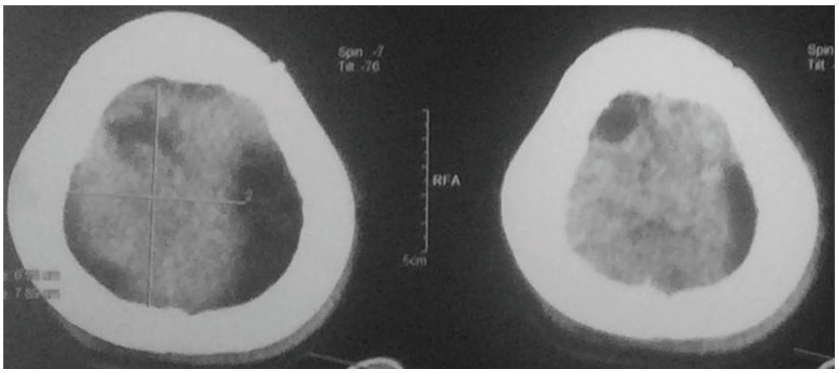

Figure 1 Axial view of brain CT Scan showing a hyperdense lesion in the vertex region indicating acute hemorrhage

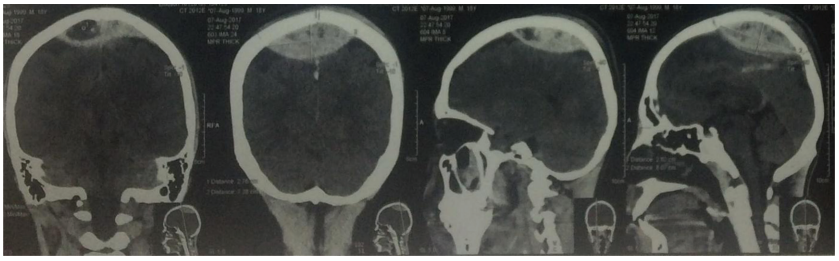

Figure 2 Coronal and sagittal view of brain CT Scan showing evidence of VEDHs with the volume of 76 ml (2.76 cm x 7.89 cm x 6.74 cm in size)

to depend on the source of hemorrhage, size of hematoma, and rapidity of hematoma formation.[6] Neurological examination results usually are both nonlocalizing and nonlateralizing. Patients also can present with dramatic findings, such as paraplegia, papilledema, anisocoria, and even coma, but rarely seizures. Upper motor neuron signs may also be present because of unilateral or bilateral compression of the parasagittal motor cortex.[1,3] VEDHs located posteriorly are likely to present with more severe symptoms and usually require surgical evacuation.[1]

VEDHs frequently cause a diagnostic dilemma, both clinically and radiographically.[3] Clinically, VEDHs are often indicated by elevated intracranial pressure (a headache which is usually severe and unrelenting, nausea, visual impairment, and vomiting). Those were resulted from compression of the venous outflow at the SSS and subsequently decreased absorption and outflow of cerebrospinal fluid (CSF), which may not contribute to the establishment of a specific diagnosis.[1,3] However, VEDHs can generate clinical manifestations with a slow rise.[7] Vertex fractures are present in most of cases with a linear fracture line crosses (usually horizontally) the sagittal suture overlying the hematoma or diastasis of the coronal and/or sagittal suture, with or without significant external sub galeal hematomas, indicating a vertex impact.[3]

Diagnosing VEDHs in axial CT scans could be difficult due to near-isodensity of the EDH with adjacent bone. It could be misinterpreted as artifacts or even overlooked altogether. Secondly, the vertex may fall outside the scanning plane. The last, the true size of the lesion, as well as the actual mass effects on the underlying brain tissue, may be dramatically underestimated when CT slices are relatively thick.[3,6,7] The vertex may be a potential anatomic blind spot on radiological findings.[7] Some authors suggest the use of Magnetic Resonance Imaging (MRI) as a diagnostic modality for VEDHs to supplement standard axial CT scans due to the size of the lesion and the significance of its effect on the SSS and brain tissue are more evident than in CT scans.[3]

In our institution, MRI is difficult to schedule on an emergency basis, and it is much more challenging to perform for neurotrauma patients who are restless or in unstable condition. Thus, the medical team suggest a sagittal or coronal reconstruction of fine-cut axial CT images through the cranial vertex as better options for diagnosing VEDH as it showed the extent of the hematoma much more clearly than did axial images.[3]

Deciding whether a VEDH indicated for emergency surgery or not could be much more difficult. Unlike standard extradural hematomas, those at the vertex do not necessarily require surgery.[3] No strict criteria for surgical intervention of VEDHs, but significant morbidity rates have been observed for patients who develop neurological signs of deterioration.[3] The choice of surgical as opposed to conservative treatment depends not only on the size of the hematoma, but also on the overall severity of symptoms, clinical evidence of disease progression, the amount of SSS displacement, and the degree of underlying mass effects and brain distortion.[3,5] Surgery is required when the patient develops progressive deterioration in consciousness and/or with the hematoma volume more than 30 ml.[1] Above that volume breakpoint, almost all patients experienced deterioration and below which the majority of conscious patients satisfactorily tolerated an extradural hematoma.[3] As VEDHs may resolve spontaneously with time, conservative treatment should be considered on a case-by-case basis. Patients with progressive clinical improvement and small hematomas require only observation, with complete resolution of the pathological findings in 6 weeks.[3]

It must be recognized that SSS tears may be exposed during surgery and may significantly complicate the surgical removal of these lesions. Many of these hematomas are likely the result of laceration of the SSS, and life-threatening

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hemorrhage may occur if the laceration is opened during surgery without adequate control of the sinus.[3] The need for a massive blood transfusion due to sudden large volume blood loss from SSS injury has to be kept in mind.[1]

CONCLUSION

The occurrence of VEDHs is rare. They represent both a diagnostic and therapeutic challenge. This study reports a case of VEDH presenting with a decrease of consciousness, retrograde amnesia, and persistent headache. After emergency craniotomy was conducted, the patient became conscious and asymptomatic. The prompt decision to surgery is vital for good outcome of the patient with VEDHs.

CONFLICT OF INTEREST

There is no potential conflict of interest relevant to this article reported.

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