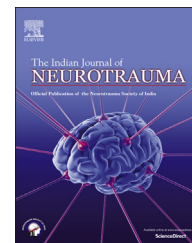


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Case Report

Horse shoe appearance of vertex extradural hematoma

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ABSTRACT

Vertex epidural hematomas (VEDHs) are well-known subtype of extradural hemorrhage, their clinical presentation can be misleading and these lesions may be missed by routine CT axial scanning. In the presented case we describe a case of 35-year man who had a large hyperdense collection with horse shoe shaped distribution on axial images. Sagittal and coronal reconstruction of the images showed greater details of the vertex extradural hematoma. 3D CT reconstruction showed diastasis of the coronal suture with fracture lines involving parietal bones. While the patient was waiting for the surgery he developed weakness of both lower limbs. The patient underwent evacuation of extradural hematoma in emergency. It is recommended to obtain CT slices until the bone of vertex in head injury patients so the diagnosis of VEDH should not be missed.

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1. Introduction

Vertex epidural hematomas (VEDHs) are well-known subtype of extradural hemorrhage that account for 1–8% of all extradural hematomas with many unique features.^{1–3} Their clinical presentation can be misleading; these lesions may be missed by routine CT axial scanning delaying the diagnosis, with possible fatal consequences.^{1,3–10} In the presented case

we describe unique imaging findings and role of CT reconstruction of the images in the diagnosis and management of vertex extradural hematoma.

2. Case report

A 35-year male patient presented with the history of fall of heavy tree branch over his head while he was under the same.

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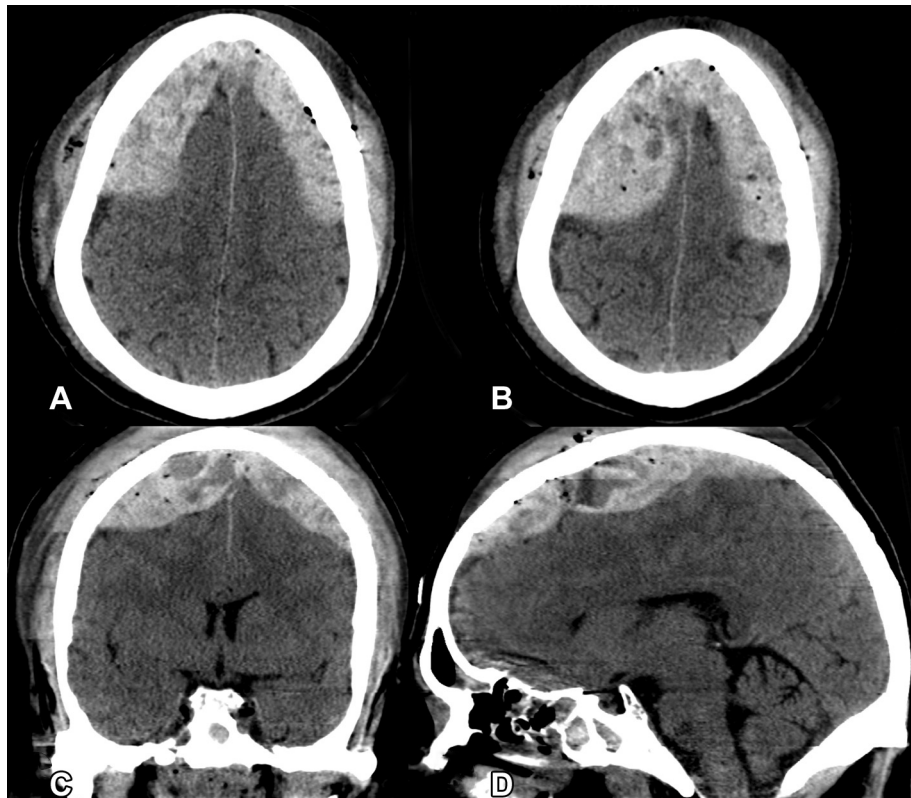


Fig. 1 – (A–D) CT scan brain plain axial, coronal and sagittal images showing a large extradural hematoma giving a horse shoe appearance on axial image (A and B).

He had history of oral, nasal as well as ear bleed. There was no history of vomiting, loss of consciousness or seizures. There was no history of diabetes or hypertension. At the time of examination in the emergency room the patient was conscious, alert and oriented. His Glasgow coma scale (GCS) was E4V5M6 (15/15). Pupils were bilateral equal and reacting to light. His general and systemic examination was unremarkable. Local examination revealed a large boggy swelling over the vertex. He had bilateral peri-orbital swelling. Clinical features (ear, nasal, oral bleed and peri-orbital swelling) were suggestive of basal skull fracture. The patient underwent CT

scan which showed a large hyperdense collection with horse shoe shaped distribution on axial images. There were multiple hypodensities in the clot and specks of air. Sagittal and coronal reconstruction of the images showed greater details of the vertex extradural hematoma (Fig. 1A–D). 3D CT reconstruction showed diastasis of the coronal suture with fracture lines involving parietal bones (Fig. 2). The patient was planned for evacuation of extradural hematoma. While the patient was waiting for the surgery he developed weakness of both lower limbs. On examination there was hypotonia, power was grade 3/5 in lower limbs, deep tendon reflexes were sluggish and

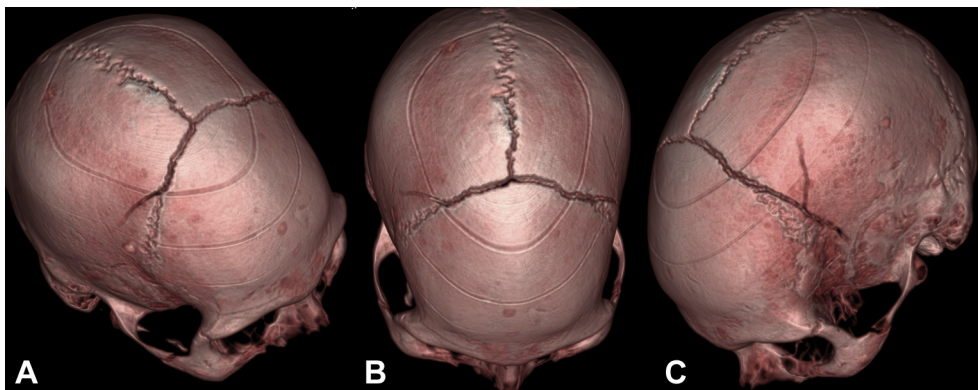


Fig. 2 – CT scan 3D reconstruction images (A, B and C) showing diastases of the coronal suture and fracture line involving bilateral parietal bones.

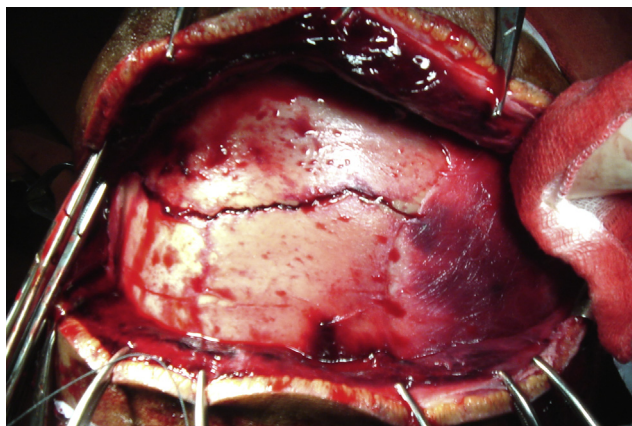


Fig. 3 – Intra-operative photograph showing diastases of the coronal suture.

planters were not elicitable. The patient was taken for emergency evacuation of extradural hematoma. A bicoronal incision (6 cm behind the coronal suture) was marked. Scalp flap was reflected to expose the coronal suture and part of the frontal bone in front of it (Fig. 3). The four burr-hole bifronto-parietal craniotomy was performed to expose the entire clot, superior sagittal sinus and midline. There was large thick extradural blood clot which was evacuated. Part of the clot adhered to the sinus was left behind. There were active bleeding from the superior sagittal sinus which was controlled with Gel foam and gentle pressure. Dural hitches were applied laterally and anteriorly well away from the midline to avoid injury to the bridging veins. Bone flap was replaced, sub-galeal suction drain was placed and incision was closed. During the procedure patient was hemodynamically stable all the time. He made good recovery after surgery and completely recovered in the lower limbs motor power. Follow up CT scan showed good evacuation of the hematoma (Fig. 4).

3. Discussion

Vertex extradural hematoma is an uncommon posttraumatic lesion and it poses a unique diagnostic difficulty. It can be missed particularly when CT scan images do not show the higher level as it can be in the “blind spot” location of VEDH.^{8,9}

If not suspected and looked carefully it can be misinterpreted as an artifact. A number of mechanisms have been described to explain the development of vertex extradural hematomas. In most of the cases an associated vertex fracture with the fracture line crossing the sagittal suture or diastasis of the sutures (either coronal or sagittal).^{3,8-12} Other source of bleeding is bridging veins, dural venous sinus and dural stripping causing diffuse dural bleeding.^{2,11,13} Even a small clot can cause compression and mechanical obstruction of the superior sagittal sinus and rise in intracranial pressure.^{12,14} Venous obstruction and direct compression can lead to the compression of the motor strip leading to motor weakness and paraplegia.^{6,15} Clinical features for vertex epidural hematomas ranges from asymptomatic presentation to rapid clinical deterioration and sudden death.^{1,3,4,7-14,16} The patient can present with headache, vomiting, decreased level of consciousness,^{2,3,12} rare cases with focal neurological deficits (monoplegia or paraplegia)^{5,10,14} and 6th cranial nerve palsy.^{10,12,17} A plain skull radiograph may show a fracture line crossing the sagittal suture or a sutural diastasis of the sagittal suture can be the finding on radiograph.^{7,10,16,18} In the past separation of the sagittal sinus from the inner table of the skull was described as a characteristic angiographic finding.¹¹ In addition there may be disruption of venous drainage and retardation in the venous flow to the sinus.^{2,3} A CT scan which should include thin cuts of the vertex region with coronal reconstruction is the investigation of choice to confirm or rule out a diagnosis of vertex extradural hematoma.^{3,5} Small vertex EDHs can pose a difficult challenge and may not be visualized on routine CT.^{1,3,7,9,13,16,18,19} In such cases an MRI or a thin section CT can help to exclude the diagnosis of VEDH.^{16,20,21} The management of VEDH is determined by the size of hematoma, any neurological deficits, clinical course (acute versus chronic), extent of displacement and distortion of the superior sagittal sinus, and the mass effect on brain.^{3,7,8,11,12,14,16,22,23} Smaller asymptomatic, slowly evolving lesions without any neurological deficits with any evidence of increase in size on follow up imaging in a stable patient can be managed conservatively.^{3,7,8,12,23} Acute or persistent symptoms, rapid neurological deterioration, focal neurological deficits, large size of the hematoma are the indication of emergency evacuation of the hematoma.^{1-3,11,12,14,16,22,24,25} It has been reported that; in spite of their small volume, the compression of the superior sagittal sinus can lead to increase in intracranial pressure and clinical deterioration.^{7,10,26} One



Fig. 4 – Post-operative CT scan axial (A), coronal (B) and sagittal (C) images showing good evacuation of extradural hematoma.

needs to be very cautious and vigilant as there are sporadic cases where the patient unexpectedly died of apnoeic and cardiac arrest without any clinical symptoms of deterioration following conservative management.²⁶ As in present case; a bicoronal skin incision provides a wider exposure bilaterally and enough opportunity to completely evacuate the hematoma without disturbing the superior sagittal sinus.²⁵ A strip of bone can be left over the superior sagittal sinus to reduce the risk of hemorrhage.²⁷ Good neurological status (GCS 12–15), smaller volume (12–38 cm³) and less midline shift (<10 mm) on the initial CT scan are associated with good outcome.^{23,28} Associated intracranial lesions i.e. cerebral contusion, intracerebral or intraventricular bleeding are associated with poorer outcome.^{13,29,30}

4. Conclusion

Although vertex extradural hematomas (VEHs) account only few of the all traumatic intracranial hematomas however they were carrying a significantly higher mortality (18–50%) in the period prior to magnetic resonance imaging.^{3,8,11} It is recommended to obtain CT slices until the bone of vertex in head injury patients so the diagnosis of VEDH should not be missed.^{5,10,16}

Conflicts of interest

All authors have none to declare.

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