

Case Report

Quartet of catastrophe: Bilateral epidural hematoma in both supratentorial and infratentorial compartments – A case report and a novel surgical technique to approach

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ABSTRACT

Background: Epidural hematoma (EDH) is the most common form of traumatic brain lesion in the posterior fossa. This condition is rapidly fatal if not identified and treated accordingly, due to the proximity of the brain stem. Prompt diagnosis is made by early computed tomography (CT) of the head and emergent evacuation is of utmost importance.

Case Description: A 28-year-old male presented to the emergency room with complaints of headache and vomiting following a road traffic accident. CT scan revealed EDH around the transverse sinus extending into supratentorial and infratentorial compartment bilaterally. The patient was planned for emergency surgery but relatives did not give consent initially they agreed after 24 h when the patient became unconscious. A midline incision was made and a small infratentorial craniectomy with two burr holes was made bilaterally above the transverse sinus. Excellent recovery was seen following a surgical procedure.

Conclusion: Posterior fossa EDH is a rare but potentially fatal entity. Bilateral extension in supratentorial and infratentorial compartments makes it a “quartet of catastrophe.” Prompt diagnosis and emergent evacuation lead to excellent recovery. Two burr holes in supratentorial compartments and a small infratentorial craniectomy can avoid sinus injury.

Keywords: Epidural hematoma, Infratentorial, Posterior fossa, Supratentorial

INTRODUCTION

Posterior fossa infratentorial epidural hematoma (EDH) are extremely rare lesions (0.1–0.3%) in traumatic brain injuries.^[5] It may be due to fracture bleed, tear of transverse or sigmoid sinuses.^[1,6] The rapid expansion of hematoma may lead to brain stem compression, tonsillar herniation, or obstructive proximal hydrocephalus. Supratentorial extension on both sides makes it potentially more fatal: a quartet of Catastrophe, that is, EDH in both supratentorial and infratentorial compartments bilaterally. Prompt diagnosis is made by early computed tomography (CT) head scans.^[1,5,6] Emergent surgery is of utmost importance. Intraoperative mortality and morbidity are a concern in posterior fossa EDH.^[1,3] Excellent recovery is seen following a safe approach and adequate hematoma evacuation.

Hereby authors describe a case of bilateral supratentorial and infratentorial EDH for which a novel technique was used to evacuate EDH which avoided sinus injury and minimal blood loss resulting in better convalescence.

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CASE ILLUSTRATION

A 28-year-old male presented to the emergency room with complaints of severe headache and vomiting following a road traffic accident where he had an impact on the back of his head with a blunt object. The patient was fully conscious at the time of admission. He was resuscitated with fluids and antiemetics. His vitals were stable. Initial CT head scans after 6 h from injury showed a fracture in the occipital bone [Figure 1] along with EDH in both supratentorial and infratentorial compartments bilaterally [Figures 2a and b]. The volume of EDH was 20.6 mL. Complete obliteration of the transverse sinus with a swirl sign was seen in the scan [Figure 2a]. 4th ventricular obliteration with proximal ventriculomegaly was also seen. His routine blood investigations were normal. CT scan of the neck was also normal. The patient was planned for emergent evacuation of hematoma but the patient's relatives did not give consent for surgery. After 24 h of admission patient's condition deteriorated and the Glasgow coma scale (GCS) score dropped to E2V2M5. A repeat CT scan of the head was done. It showed an increase in the size of the hematoma from 20.6 mL to 32.6 mL which led to severe compression on the brain stem with proximal hydrocephalus as manifested by

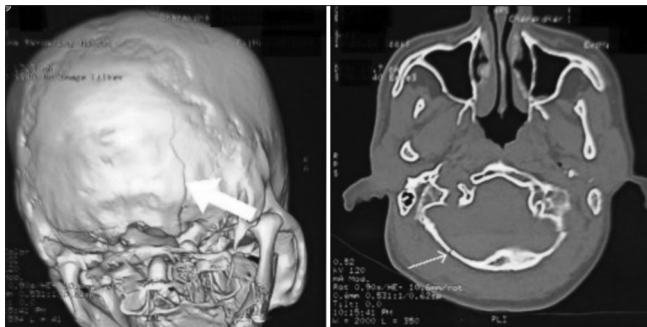


Figure 1: Preoperative computed tomography scan of the head bony window showing fractured occipital bone (thick arrow and thin arrow).

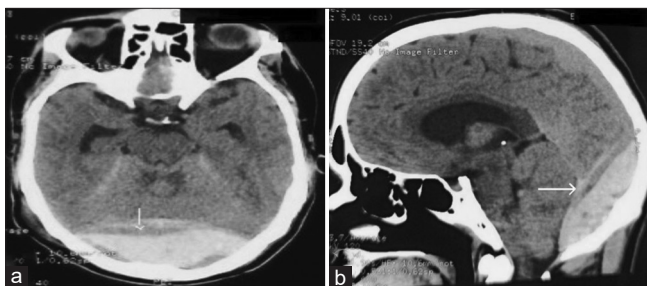


Figure 2: (a) Preoperative axial computed tomography (CT) scan head showing posterior fossa Epidural hematoma (EDH) with swirl sign (thin arrow) (b) preoperative sagittal CT scan head showing EDH in both supratentorial and infratentorial compartments (thin arrow).

an increase in the size of temporal horns [Figures 3a and b]. After the deterioration, the patient's relatives agreed to surgery. The preoperative GCS score was E1V1M5. In a prone position under general anesthesia, a midline incision was made and a small infratentorial craniectomy for infratentorial EDH was done along with two burr holes made above transverse sinus bilaterally for supratentorial EDH and slightly enlarged with Kerrison punch [Figure 4]. Adequate evacuation of hematoma was done. The source of bleeding was ruptured emissary diploic veins in the infratentorial compartment and probably stripping of venous sinuses with overlying fractured bone in the supratentorial compartment. Postdecompression dural pulsation was seen. The patient was observed in the intensive care unit for 24 h. The patient made an excellent recovery in the postoperative period. The patient regained full consciousness 24 h after surgery. Postoperative scans showed evacuated EDH with a small amount of residual blood along the transverse sinus [Figures 5a and

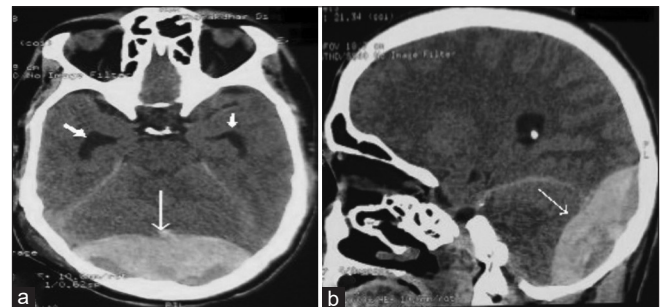


Figure 3: (a) Preoperative axial computed tomography (CT) scan head after 24 h of admission showing an increase in the size of hematoma (thin arrow) with an increase in the size of temporal horns (thick arrow) (b) preoperative sagittal CT scan head after 24 h of admission showing an increase in the size of hematoma (thin arrow).

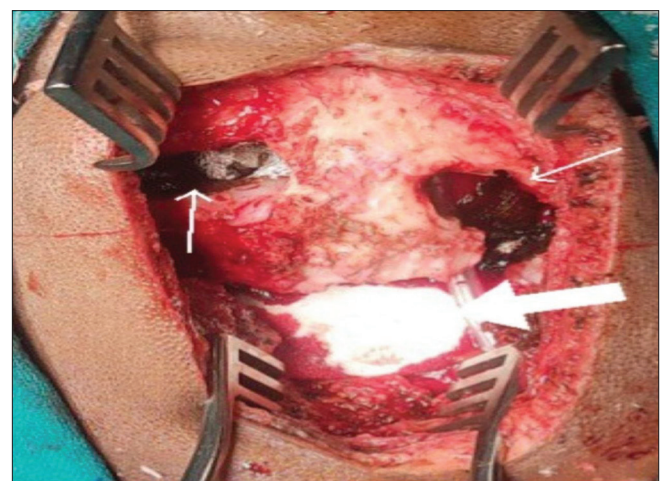


Figure 4: Intraoperative image showing two burr holes in supratentorial compartments which are enlarged by Kerrison punch (thin arrows) and small craniectomy in infratentorial compartment covered by gel foam (thick arrow).

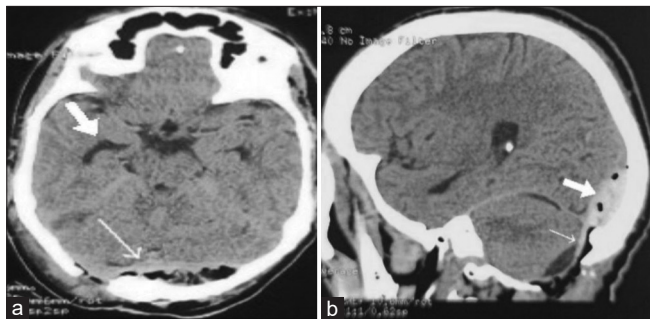


Figure 5: (a) Postoperative axial computed tomography (CT) scan head on day 1 showing evacuated Epidural hematoma (EDH) (thin arrow) and decrease in size of ventricles (thick arrow) (b) postoperative sagittal CT scan head showing evacuated infratentorial EDH (thin arrow) and a small amount of residual blood (thick arrow).

b]. 4th ventricle was also visualized with a decrease in the size of the ventricles [Figure 5a]. The transverse sinus was completely visualized in scans [Figure 5b]. The patient was discharged on day 9 in a fully conscious state.

DISCUSSION

Posterior fossa infratentorial EDH is a rare entity in (0.1–0.3%) the continuum of traumatic brain injuries.^[5] Bilateral extension of hematoma over the supratentorial region makes it more lethal due to severe brain stem compression,^[6] Quartet of Catastrophe; EDH in both supratentorial and infratentorial compartments bilaterally. These lesions are caused by venous bleeding (85%);^[6] transverse or sigmoid sinus tear or fracture bleed as the occipital fracture is also associated with these lesions (40–86%).^[1] CT scans are of paramount importance to diagnose these types of lesions. CT scans show hyperdense lesions in the posterior fossa around the transverse sinus. Rapidly enhancing hematoma can compress the brain stem severely and 4th ventricular obstruction can lead to obstructive proximal hydrocephalus, such associations make it fatal. In our index case, the hematoma was extending in supratentorial and infratentorial compartments bilaterally. In the scan active bleeding was represented by a low-density area in between hyperdensity, that is, a swirl sign.^[2] Active bleeding led to the progression of the size of the hematoma and further severe compression of the brain stem probably due to the bilateral nature of the lesion, which in turn caused rapid deterioration of the patient.

Emergent surgical evacuation is the treatment of choice in these types of patients. Suboccipital craniectomy/craniotomy with evacuation of EDH has excellent results for infratentorial EDH. For supratentorial extensions of EDH craniotomy or burr holes can be made. Bony strips over sinuses are not touched as inadvertent injury to sinuses leads to air embolism, hypotension due to massive bleeding, or hypoxic brain injury.^[1,2,4]

Other surgical methods are single bone craniotomy involving both supratentorial and infratentorial compartments but contemplating direct supratentorial and infratentorial craniotomy may lead to iatrogenic injury to the sinuses or dislodge the clot over the sinuses, which along with bone strips provides tamponade effect over the injured sinuses, which, in turn, may lead to massive bleeding. Adequate hemostasis is necessary to avoid reaccumulation of hematoma.^[1]

In our case, bilateral extension of EDH in both supratentorial and infratentorial compartments was managed by a novel technique by making two burr holes in supratentorial compartments and small infratentorial craniectomy to minimize venous sinuses injury. A small amount of residual blood trickles down slowly through the burr hole after a few days which is easily absorbed by subgaleal tissue.

Mortality in posterior fossa EDH is 0–50% in various studies due to late presentation, intraoperative bleeding, etc.^[1] Operative mortality has been reported up to 14% most probably due to uncontrolled bleeding from sinus injury.^[1,4] Hence, with this novel technique, we can minimize the sinus injury which can lead to better convalescence.

CONCLUSION

Posterior fossa EDH is a rare but fatal entity. Extension of hematoma above supratentorial regions bilaterally makes a “quartet of catastrophe.” Prompt diagnosis along with safe and emergent evacuation of hematoma leads to excellent recovery. Two burr holes in supratentorial compartments and a small infratentorial craniectomy can avoid sinus injury.

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Declaration of patient consent

Patient’s consent not required as patient’s identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)- assisted technology for assisting in the

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