Multiterritorial Extradural Hematoma: Evacuation through Single Incision and Multiple Craniotomies

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Abstract

We report a case of extradural hematoma (EDH) involving multiple territories. Patient was operated upon through a single incision and multiple craniotomies, with gradual postoperative improvement. It is concluded that a single incision can suffice to evacuate multiple EDHs from different territories with early recovery and less morbidity.

Keywords

- extradural hematoma
- posterior fossa
- craniotomy

Introduction

Extradural hematoma (EDH) is one of the life-threatening conditions needing immediate neurosurgical intervention. Occipital and posterior fossa EDHs are not uncommon, with the incidence of posterior fossa EDH being 10 to 11%.[1] Combined EDH (CEDH) of supra- and infratentorial regions are rare[2] and difficult to diagnose due to their nonspecific symptomatology and small volume but can cause sudden death.[1] CEDH are less described, and extension of the same into the temporal region has not been described to the best of our knowledge. An unusual case of CEDH of supra- and infratentorial regions with left temporal extension and its management is being described.

Case Report

A 28-year-old male patient presented to emergency services with a 2-day-old history of roadside accident. After initial conservative management from the referring hospital, the patient presented with progressive drowsiness and irritability. Computed tomography scan of head revealed posterior fossa EDH over both cerebellar hemispheres extending to the bilateral occipital and left temporal regions. There was associated bifrontal countercoup contusions and mild ventriculomegaly secondary to fourth ventricular compression (►**Fig. 1A, B**). The presenting Glasgow Coma Scale (GCS) was E2V4M6 and pupillary asymmetry, left being 4 mm nonreactive and right being normal. Surgical evacuation of CEDH was done by putting the patient in park bench position under general anesthesia, enabling access to all the involved regions. The incision extended superiorly from the midline suboccipital region in a hockey stick fashion to include the bilateral occipital and left temporal regions, enabling three separate craniotomies for evacuation of the CEDH (►**Fig. 2A, B**). In view of fourth ventricular compression and hydrocephalus, suboccipital craniectomy was performed. The source of bleed was from torcula/adjoining transverse sinus for which a thin strip of overlying bone with adherent firm clot were left behind. Rest of the CEDH was evacuated by a bilateral occipital and a left temporal craniotomy (►**Fig. 1F**). Linear fractures were noted over the left lambdoid suture and the suboccipital region (►**Fig. 1C**). Postoperatively patient attained normal GCS and pupillary reaction with satisfactory postoperative imaging (►**Fig. 1D, E**)

Discussion

The term *bilateral EDH* signifies occurrence of symmetrically or asymmetrically located EDH on either side of the brain, which occurs due to dural detachment at two different locations by a single impact. Ipsilateral double EDH, on the other hand, can be described as two noncontiguous EDHs on the same side. Multiple EDHs refer to the situation where there are more than

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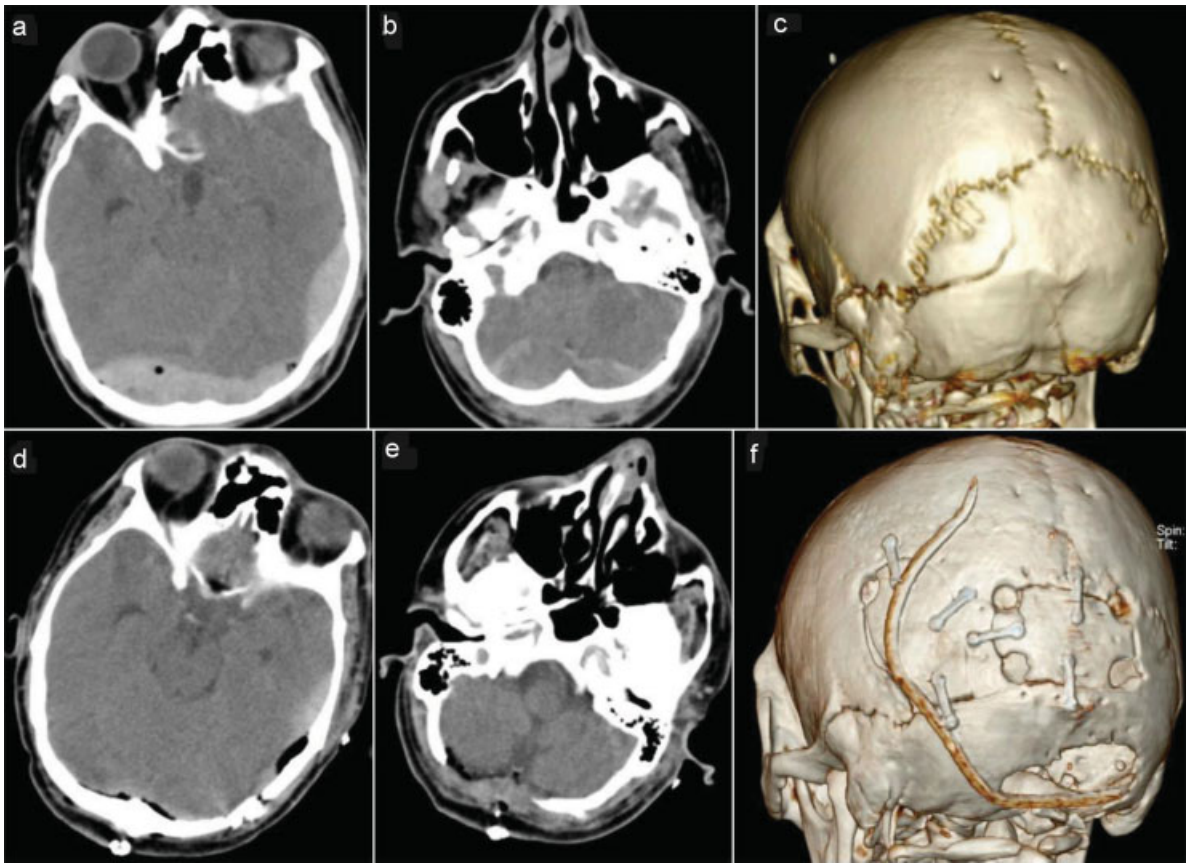

Fig. 1 **(A)** Axial computed tomography (CT) showing bilateral occipital and left temporal extradural hematoma (EDH). **(B)** Axial CT showing posterior fossa EDH. **(C)** Three-dimensional (3D) recon image showing linear fracture over the left lambdoid suture and the suboccipital bone. **(D,E)** Postoperative axial scan showing evacuated occipital, temporal, and posterior fossa EDH. **(F)** 3D recon image showing suboccipital craniectomy, and bioccipital and left temporal craniotomy.

two EDHs present in different territories.[2] The incidence of bilateral EDH varies from 2 to 25% in different series, and its presence at more than two sites is rare.[3] Bilateral hematomas are usually due to venous or arterial bleed, the former being common but delayed in nature.[1] Bilateral EDH is predicted to occur in majority of the cases, with the trajectory of impact in the anteroposterior direction, which leads to stripping of dura as a result of inbending or outbending of the skull.[4] The contralateral dural stripping is a result of motion of the skull, aggravated by the negative intracranial pressure found at the antipode of the compression force[5] and extension of fracture line across midline. All these mechanisms can lead to mixed arterial and venous bleeding, the latter due to disruption of emissary veins, sinuses, and venous lakes. In the present case, the anteroposterior impact has led to linear fractures involving the left lambdoid suture and the suboccipital bone, with probable cause of bleed from the torcula and adjoining sinus, which led to the CEDH formation.

Fig. 2 **(A)** Park bench position with hockey stick incision. **(B)** Intraoperative image showing suboccipital craniectomy (gray arrow), bioccipital craniotomy (green arrow), left temporal craniotomy (white arrow), and fracture line over lambdoid suture (blue arrow).

Bilateral epidural hematomas present with high incidence of loss of consciousness,[6] the incidence being as high as 98% in some series.[4] However, Dharker and Bhargava[7] mentions 30% cases with GCS less than 8. Feuerman et al[8] reported asymptomatic acute bilateral epidural hematoma in a case with minor head trauma. The present case maintained a GCS of 14 to 15 for 2 days, which worsened to GCS of 12, warranting a referral to tertiary center. Since mortality associated with bilateral hematomas is high,[2] surgical intervention is recommended at the earliest. To the best of our knowledge, bilateral supra- and infratentorial EDH with extension into multiple territories has not been described previously. Hence, the present case is unique where the EDH extends into supra- and infratentorial regions with another EDH in the temporal region. Delayed deterioration suggests the bleed to be of venous origin, which was confirmed during surgery around the region of torcula.

Simultaneous bilateral craniotomies and fast evacuation of epidural hematomas has led to good outcome in the past.[2] There is a description about evacuation of bilateral parietal EDH through single bicoronal incision and bilateral craniotomies.[9] In the present case, a single hockey stick shaped incision was made to evacuate the CEDH with further extension into the left temporal region for the third craniotomy and EDH evacuation. This reduced operating time, with prompt relief of compression and immediate postoperative recovery. To conclude, multiterritorial EDH involving supra- and infratentorial territories is a rare presentation that should be evacuated at the earliest. The planning of incision and the placement of craniotomies has to be executed based on the radiological findings and the possible source of bleed.

Disclosure
The patient and his next of kin have consented to submission of this case report to the journal.

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Conflict of Interest
None.

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