

# Concomitant Overlapping Acute Extradural and Subdural Hematoma

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## Abstract

### Keywords

- ▶ extradural hematoma
- ▶ acute subdural hematoma
- ▶ traumatic brain injury
- ▶ cerebral contusion

Usually following traumatic brain injury, extradural hematoma (EDH) and subdural hematoma (SDH) appear in opposite locations, with EDH being a coup injury and SDH being a contrecoup injury. We present a case of 24-year-old male patient who had concomitant overlapping acute EDH and SDH requiring neurosurgical intervention and discuss the clinical relevance of these coexisting lesions. Concomitant overlapping EDH and SDH are uncommon lesions and need close observation and planned follow-up imaging.

## Introduction

Concomitant overlapping acute extradural hematoma (EDH) and subdural hematoma (SDH) are uncommon presentation of traumatic brain injury.<sup>1–8</sup> These lesions have characteristic imaging appearance, and presence of SDH reflects the severity of the injury to the underlying brain.<sup>1–5</sup> We present a case of concomitant overlapping acute EDH and SDH where there was enlargement of the EDH and relative reduction in the size of SDH (both of them required neurosurgical intervention), and discuss the clinical relevance of these coexisting lesions.

## Case Report

A 24-year-old male patient was brought to the emergency room (ER) around 6 hours after the incident with the alleged history of sustained injuries due to skid and fall from bike while he was driving the vehicle. He had suffered loss of consciousness since then and had two episodes of vomiting and nasal bleeding. There was no history of seizures. At the time of admission, his pulse rate was 83 bpm and blood pressure was 110/70 mm Hg. Glasgow Coma Score (GCS) was E1V1M4, pupils were bilateral 2 mm reacting to light, and all four limbs were moving equally. The patient was under the influence of alcohol. In view of low GCS, the patient was intubated in ER and kept on mechanical ventilator. His blood investigations

including coagulation profile were in normal range. His computed tomography (CT) scan brain showed a left fronto-temporal thin EDH and underlying thin acute SDH with mild mass effect (**Fig. 1A–D**). In addition, there was small left posterior-temporal contusion. As the hematoma was small in size, he was planned for initial conservative management followed by an elective repeat CT scan. Repeat CT scan of the brain showed increase in the volume of the EDH, reduction in the size of acute SDH, and increase in the size of the left posterior-temporal contusion with increase in mass effect and midline shift (**Fig. 1E–H**). The patient was taken up for evacuation of the intracranial hematomas. He underwent left fronto-temporal craniotomy and evacuation of the thick EDH. Following evacuation of the EDH, the dura was tense; hence, it was decided to open the dura and the SDH was evacuated as well. Following surgery, the patient responded well and could be weaned-off from the ventilator and discharged on seventh postoperative day (GCS E4V5M6, no deficits).

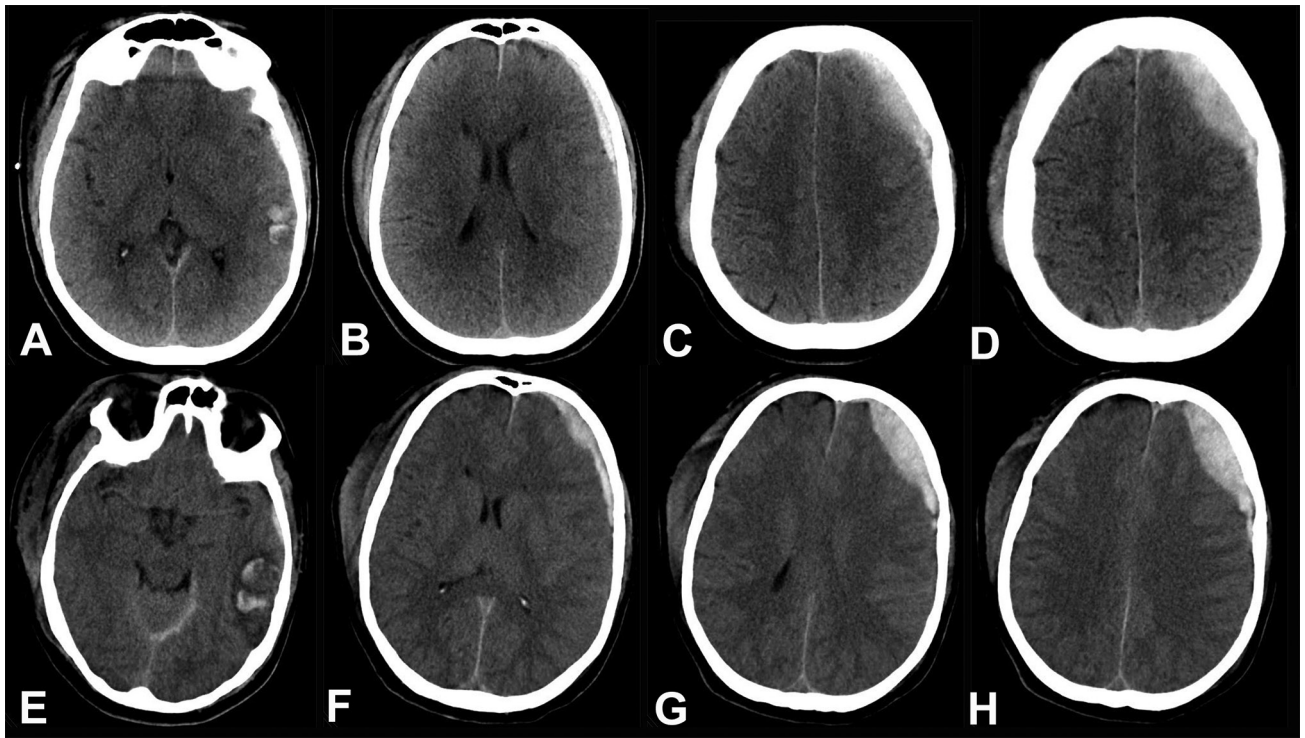
## Discussion

Usually following traumatic brain injury, EDH and SDH appear in opposite locations, EDH being a coup injury and SDH being a contrecoup injury.<sup>1–3,5,6,8</sup> The underlying mechanism in our case was also similar in nature, EDH was due to coup injury on left side and SDH was due to contrecoup injury originating on right side (as in present case; ▶ **Fig. 1**). With

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**Fig. 1** (A–D) CT scan brain showed a left fronto-temporal thin extradural hematoma and underlying thin acute subdural hematoma with mild mass effect and a small left posterior temporal contusion. (E–H) Repeat CT scan of the brain showed increase in the volume of the extradural hematoma, reduction in the size of acute subdural hematoma and increase in the size of the left posterior-temporal contusion with increase in mass effect and midline shift (please note the scalp swelling on right side). CT, computed tomography.

the advancements in imaging techniques, progression in the size of EDH and intraparenchymal contusion is increasingly recognized.<sup>9-12</sup> This progression in the size of hematomas is more likely if a CT scan is performed in early stage after the traumatic brain injury.<sup>12</sup> As described in the literature, we believe that the reduction in the size of the SDH was due to partial redistribution and mixing of the blood with cerebrospinal fluid and thus into the subarachnoid space.<sup>2</sup> However, the overall mass effect and cerebral edema were increased, which was because of increase in the size and mass effect due to left posterior-temporal contusion.

CT scan of the brain is the investigation of choice both as the initial modality of imaging as well as for follow-up imaging.<sup>1-3,12</sup> Overlapping EDH and SDH shall give rise to characteristic “CT comma sign.”<sup>1,3</sup> Larger size hematomas and hematomas associated with mass effect need surgical evacuation, which is followed by standard neurosurgical care and good recovery.<sup>1,3,6,13-16</sup> The outcome is determined by the neurologic status of the patient, severity of the underlying injury to the brain, and rapidity of neurosurgical intervention.<sup>1,2,13,14</sup>

## Conclusion

Concomitant overlapping EDH and SDH are uncommon lesions and need close observation and planned follow-up imaging. Increase in the size of the lesions and mass effect shall require neurosurgical intervention including evacuation of intracranial hematomas.

## Conflict of Interest

None declared.

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