Contrecoup Acute Epidural Hematoma—A Rare Case Report

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Abstract

Epidural hematoma (EDH) is a traumatic accumulation of blood between the inner table of the skull and the dural membrane. Contact-related skull deformation causes inbending or fracturing of cranium or both, leading to separation of the dura mater from inner table. This injures the dural arteries, veins, venous sinus, or diploid channels, producing EDH. They usually occur as a result of direct impact injuries to the head, ipsilateral to impact side. Incidence of epidural hematoma is 1 to 3% of all head injuries. Contrecoup EDH cases are rare. and because of its rarity, we present a case report of a 17-year-old boy with contrecoup EDH who sustained head injury due to road traffic accident. Computed tomography of the brain showed left occipital bone fracture and large contrecoup extradural hematoma in right frontal region associated with pneumocephalus and hemorrhagic contusional edema beneath it. The EDH was operated on, and the patient was discharged uneventfully.

Keywords
- epidural hematoma
- contrecoup
- head injuries

Introduction

Epidural hematoma (EDH) usually occurs as a result of direct impact injuries of the head, ipsilateral to impact side. These are frequently associated with local scalp bruise or occur beneath the fracture site, although occasional epidural hematoma without skull fractures have been reported.[1] EDH may occur in 1% of patients with head injury.[2,3] The peak incidence of EDH is in the second decade, with a mean age of 20 to 30 years, and it is rare in patients older than 50 to 60 years.[4] Contrecoup EDH cases are rare,[2] and only 10 cases have been reported in the literature on extensive search. Herein, because of rarity of EDH, we report a case of contrecoup EDH with pneumocephalus in the right frontal region associated with left occipital bone fracture.

Case Report

A 17-year-old boy was referred to us from a district hospital with history of road traffic accident 18 hours earlier. He has been disoriented since the injury, with history of two episodes of vomiting, but no history of seizures, bleeding from the ear, nose, or throat. On examination, a stitched lacerated wound of 5 cm over the left occipital region was present. His Glasgow coma scale (GCS) score was 14. Pupils were bilaterally semidilated and reacting, with pulse rate 58 beats/min. Computed tomography (CT) scan revealed large epidural hematoma in right frontal region with associated small pneumocephalus and hemorrhagic contusional edema beneath it with left occipital bone fracture (►**Fig. 1A, B**). The patient was immediately operated upon after preparation, and a right frontal craniotomy with evacuation of extradural hematoma was performed. No fracture was present intraoperatively in the right frontal region. Postoperative CT scan was done, which showed postoperative changes (►**Fig. 1C, D**). Mannitol was administered in the postoperative period. His GCS improved to 15 in the second postoperative day, and the patient was discharged uneventfully.

Discussion

Incidence of extradural hematoma is 1 to 3% of all head injuries.[1] Mortality rate varies from 10 to 40% and is an

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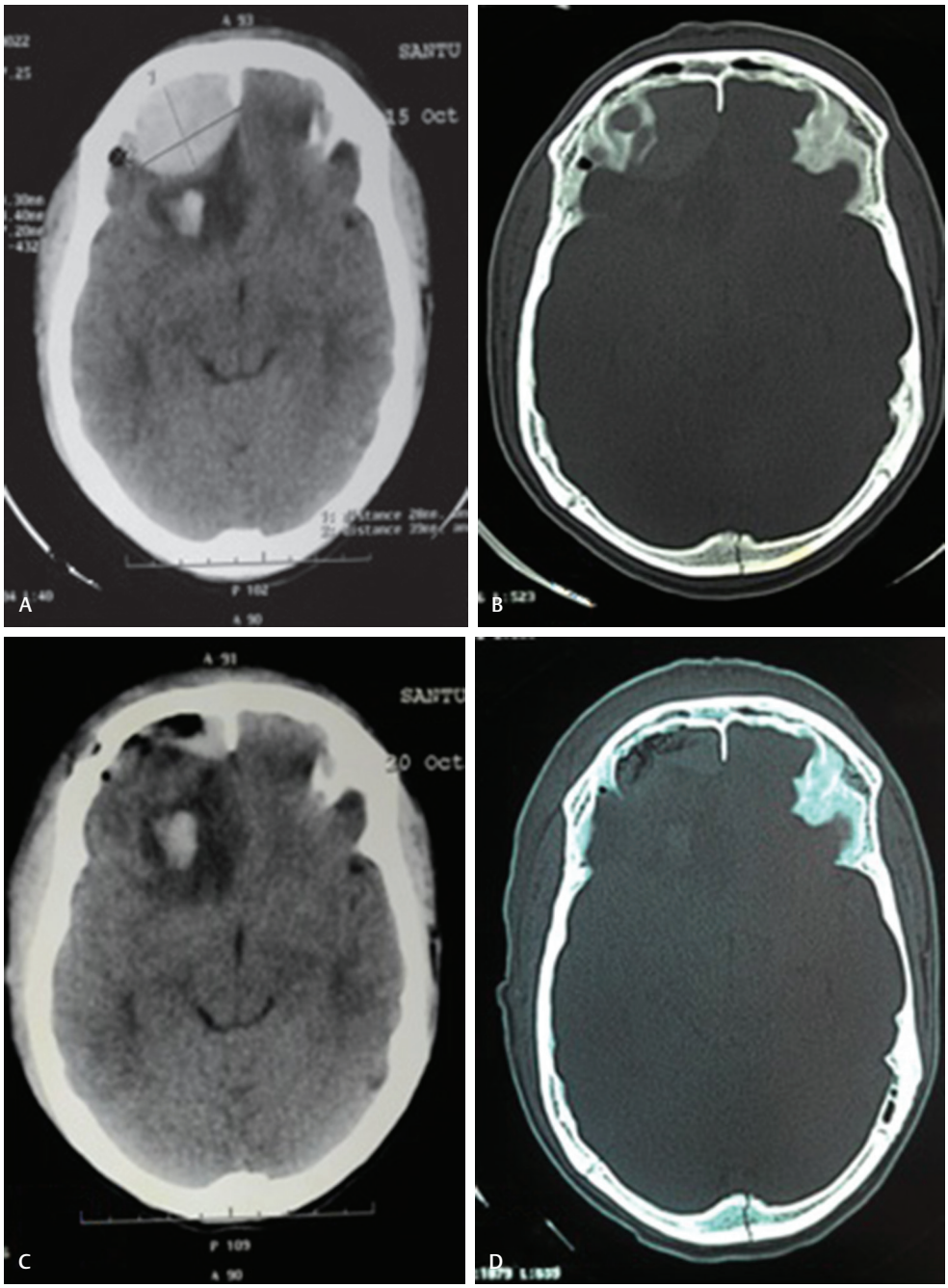

Fig. 1 (**A**, **B**) CT scan showing large epidural hematoma in right frontal region with associated small pneumocephalus and hemorrhagic contusional edema beneath it with left occipital bone fracture. (**C**, **D**) Postoperative CT scan showing postoperative changes. CT, computed tomography.

index of alertness and efficiency of health care and hospital setup.[2] Blunt head trauma is the most frequent cause of EDH with a percentage range between 1 and 6%.[3] Although contrecoup contusions and acute subdural hematoma resulting from acceleration injuries to the head have been reported, only 10 cases of contrecoup epidural hematoma have been published in the literature.[1] The clinical-radiologic features of all the 11 cases including this case are summarized in ►**Table 1**.[4–12]

The mechanism of contrecoup EDH remains unclear. Dural separation and dural vessel injury caused by distortion of the cranium brought on by the force of impact are possible mechanisms that could contribute to the development of EDH.[4] According to Jamieson,[13] contrecoup epidural hematoma does not occur but can present as bilateral when midline vessel of sagittal sinus is involved or multiple blows have been experienced. However, later in 1991, an unusual type of bilateral epidural hematoma, one due to direct injury and another due to the contrecoup effect has been reported by Balasubraminiam and Ramesh.[14] They observed that local deformation at the site exactly opposite the impact site gave rise to a small pocket brought on by stripping of dura. This deformation and "reliance effect" produced by evacuation of first hematoma resulted in contrecoup hematoma. Miyazaki et al[9] also reported a case of bilateral coup and contrecoup epidural hematoma. They concluded that distortion of the

Table 1 Summary of cases of contrecoup epidural hematoma

Author (year)	Age/ Sex	Site of impact	Fracture	Coup injury	Contrecoup injury	Operation for contrecoup EDH	Outcome
Okamoto[5] (1983)	51/F	Occipital	–	–	Frontal EDH	+	GR
Shigemori[6] (1985)	43/M	Frontotemporal	+	–	Occipital EDH	+	GR
Hamasaki[7] (1987)	58/F	Occipital	+	Cerebellar contusion SDH (posterior fossa)	Frontal EDH	–	D
Abe[8] (1988)	36/M	Frontal	+	–	Occipital EDH	+	D
Miyazaki[9] (1995)	52/F	Occipital	+	Occipital EDH	Frontal EDH	+	GR
Motohashi[10] (2000)	59/F	Occipital	+	–	Frontotemporal contusion Frontal EDH frontal contusion	–	GR
Mishra[1] (2001)	50/M	Frontoparietal	+	Frontoparietal contusion	Frontoparietal EDH	+	GR
Mitsuyam[11] (2004)	50/F	Parietal	+	Parietal EDH	Frontal EDH	–	GR
Sato[11] (2009)	68/F	Occipital	+	Occipital EDH cerebellar contusion	Frontal EDH	–	GR
Takeuchi[4] (2010)	60/F	Occipital	+	cerebellar contusion	Frontal EDH	–	GR
Present case	17/M	occipital	+	–	Frontal EDH Pneumocephalus	+	GR

Abbreviations: D, death; EDH, epidural hematoma; F, female; GR, good recovery; M, male.

cranium brought on by the force of impact leads to dural separation resulting in hematoma.

This case showed a small air pocket besides the EDH, but intraoperatively and on imaging there was no skull fracture at the frontal region and the base. This finding is also supported by Choi et al[15] who has reported a case of pneumocephalus without a skull base fracture. Two mechanisms have been proposed to explain pneumocephalus without craniofacial skull fracture, both involving low intracranial pressures that result in the "sucking" of air through a dural defect. The first mechanism involves vertical pressure that creates a pressure gradient within the cerebrospinal fluid (CSF) system, whereas the second involves a ball valve effect that allows air to enter the skull base through multiple foramen or the craniocervical junction pathway.

Conclusion

Acute EDH is a neurosurgical emergency with high mortality. Contrecoup EDH is a rare entity, but early diagnosis and timely treatment can lead to good prognosis. Most of the cases reported in the literature have occurred in old-age group. In the present case, contrecoup epidural hematoma was seen in younger age group, which is a rare presentation. This case also presented with pneumocephalus with contrecoup EDH without any fracture at the contrecoup site.

Conflict of Interest
None.

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