*BRAIN INJURY*

# Delayed Extradural Hematoma Occurring After Evacuation Of Acute Contralateral Extradural Hematoma: Case Report and Literature Review

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## ABSTRACT

**Introduction:**
Traumatic head injuries resulting in extradural hematoma (EDH) occur in about 2% of patients. The development of EDH on the opposite side is an infrequent complication that has been documented in several case reports.
**Method:** This case report presents an unusual occurrence of delayed extradural hematoma (EDH) after the surgical evacuation of an acute contralateral EDH. A 22-year-old patient, involved in a high-velocity traffic accident, initially presented with a Glasgow Coma Scale of 12, significant agitation, and right anisocoria. Initial imaging revealed a substantial right frontal EDH, prompting immediate evacuation. Postoperatively, the patient developed left anisocoria, prompting a repeat brain CT scan that revealed a left frontal EDH. Surgical intervention was again necessary for evacuation, with the source of bleeding identified as dural. The patient recovered well postoperatively, underscoring the importance of vigilant monitoring and prompt intervention in managing EDH cases, particularly given the potential for delayed complications. This case underscores the intricacies and challenges associated with traumatic brain injury management, emphasizing the necessity for comprehensive evaluation and timely surgical intervention to mitigate adverse outcomes.
**Conclusion:** The diagnosis of delayed onset extradural hematoma (EDH) arises when the initial computed tomography scan appears negative or is conducted early, while subsequent CT scans, performed to evaluate clinical or intracranial pressure (ICP) deterioration, reveal the presence of an EDH. Identifying this condition necessitates a heightened suspicion, considering the injury mechanism and fracture patterns. Additionally, alterations in pupillary size, elevated intracranial pressure, and intraoperative brain bulging provide further clues to contralateral bleeding. Neurological deterioration may or may not coincide with delayed EDH presentation. Early postoperative non-contrast CT scans within 24 hours are advised to detect this complication, irrespective of neurological status.

***Keys word****: Extradural hematoma, Delayed onset, Contralateral hematoma, Traumatic brain injury*

## INTRODUCTION:

Extra-dural hematoma is a collection of blood developed between the dura mater and the skull bone [2]. Extradural hematoma is a neurosurgical emergency as it may cause an acute increase in intracranial pressure (ICP) following trauma requiring rapid emergency [2, 3]. Early treatment is necessary to reduce morbidity and mortality[6].Medical transports and brain scans have significantly contributed to the speed of diagnosis and therefore the quality of treatment for these injuries. EDH always represents a significant neurotraumatic emergency. Nowadays, there should be no hesitation in transferring a head-injured patient, even with minimal trauma, for a scan, as this is the price we pay to move towards zero mortality and sequel-free recovery from EDH.The occurrence of EDH on the opposite side is an infrequent complication documented in several case studies [7]. This complication may manifest either as a delayed issue or arise during surgery. Neglecting to detect a delayed onset of contralateral EDH can lead to severe consequences for the patient. Here, we present the case of a young male involved in a road traffic accident who experienced postoperative contralateral EDH.

## CASE REPORT:

A 22-year-old male arrived at the emergency department following a road traffic accident involving a collision between his two-wheeler and a four-wheeler. Initially treated at a local hospital, he was transferred to our facility four hours post-injury. His medical history included loss of consciousness, one episode of vomiting, and nasal bleeding. Neurological examination revealed withdrawal response to painful stimuli in all limbs and pupillary anisocoria, with the right pupil larger than the left. Initial vital signs indicated a pulse rate of 80 beats per minute and blood pressure of 140/90 mm Hg. The patient was intubated, sedated, and placed on mechanical ventilation. A non-contrast computed tomography (NCCT) scan of the head and cervical spine was ordered, revealing a sizable acute extradural bleed on the right frontal region with mass effect extending towards the right side, along with fractures of the right frontal bone. Subsequently, the patient underwent a right-sided frontal craniotomy where a large epidural hematoma (EDH) with active bleeding from a fontal branch of middle meningeal artery branch was identified and managed. Postoperatively, the patient was admitted to the intensive care unit (ICU), sedated, paralyzed, and remained on mechanical

ventilation. Follow-up neurological examination showed responsiveness to painful stimuli, normal pupil size, and reaction to light. Two days post-surgery, the patient developed coagulation disturbances and left anisocoria, prompting a repeat brain CT scan revealed a significant left-sided extradural bleed, prompting a repeat craniotomy on the left side for hematoma evacuation. After surgery, the patient remained in the ICU and was successfully extubated the following day. His consciousness improved progressively, with a Glasgow Coma Scale (GCS) score rising from 6 to 14 by postoperative day 3. Subsequent imaging confirmed resolution of the hematoma, and bilateral drains were removed on the third postoperative day. After an 11-day hospital stay, the patient was discharged home and has been undergoing regular outpatient follow-up visits without complications.

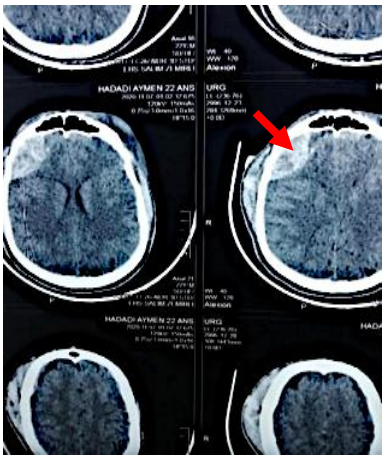

**Figure 1 CT scan showing right frontal EDH**

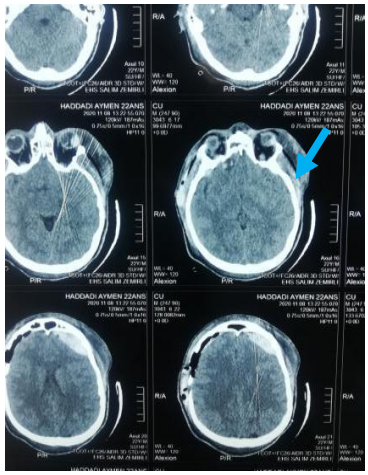

**Figure 2: post cerebral CT scan shows complete evacuation of right frontal hematoma formation of left**

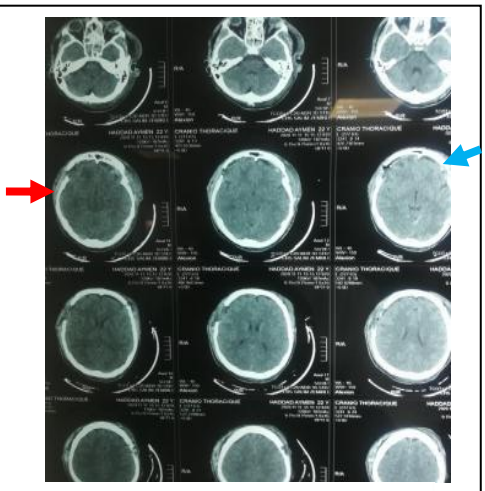

**Figure 3 the follow up cerebral CT scan confirms complete evacuation of both extradural hematomas**

## DISCUSSION

In our observation, the occurrence of extradural hematoma following a traffic accident with violent kinetics in the context of polytrauma is noted. Classically [3]. However, some specialized centers report a frequency rate of 20% [7]. The predominance of males is typical in traumatology [1].

The temporal region is the most frequently affected (43%), followed by the frontal region (30%) [8].

"Hematomas at the extremes": These are frontal hematomas or occipital hematomas. These are polar hematomas, developing in less talkative areas, evolving in a sub-acute or even chronic manner. Sudden worsening with temporal or cerebellar engagement can occur at any time and therefore justifies considering them as particularly urgent cases to treat, which explains the silent onset of a second left frontal HED. [7]

"Delayed forms": These are cases observed more often nowadays due to the widespread use of rapid transportation and repeated systematic scanning at a distance from the accident. The definition of a delayed H.E.D. is essentially based on computed tomography scan. It is a lesion not visible on the first post-traumatic CT scan but becomes apparent on subsequent examination.

Delayed epidural hematoma (EDH) following traumatic brain injury is a critical condition necessitating prompt diagnosis and intervention. Utilizing non-contrast computed tomography (NCCT) scans upon admission helps in immediate detection, but delayed onset EDH may manifest when initial scans are negative or when subsequent scans reveal hematoma formation. Clinical suspicion, especially considering the injury mechanism and fracture patterns, is crucial for diagnosis. Signs such as changes in pupil size, increased intracranial pressure (ICP), and intraoperative brain bulging provide additional clues, even without neurological deterioration. [6]

In our case, postoperative neurological status remained stable without a decrease in the Glasgow Coma Scale (GCS) score. Early postoperative NCCT scans, ideally within 24 hours, are recommended to identify this complication, irrespective of neurological changes.

The pathophysiology underlying contralateral EDH involves the loss of tamponade effect on the dura post-hematoma evacuation, leading to a disruption in ICP equilibrium. Decompressive craniectomy further exacerbates this by lowering ICP and separating the opposite dura from the calvaria. This disruption in hemostasis and brain equilibrium facilitates EDH formation. In our case, brain shift post-acute EDH evacuation, particularly due to associated temporal bone fracture, likely contributed to contralateral EDH development.

The absence of a visible fracture should not exclude the possibility of developing a delayed H.E.D. This lesion is rare in children, whereas in adults, it accounts for between 5% and 10% of H.E.D. The lesion can appear hours after the accident and up to 16 days after the trauma. The persistence of severe headaches in this case should lead to diagnostic CT scanning. In practice, it should be noted that in patients promptly attended to, any doubt should lead to performing a second CT scan.

## CONCLUSION

The outlook for this condition is generally positive when the complication is detected early, and surgical treatment is promptly initiated. Delayed diagnosis, however, can significantly increase the risk of mortality. Vigilance during surgery, noting signs like an intraoperative bulge or contralateral fracture, coupled with early postoperative CT scans, aids in promptly identifying such patients. In the specific case mentioned, the patient achieved full recovery of consciousness and sensorimotor functions.

## Conflict of Interst

None declared.

**REFERENCES:**

**1. Wohltmann CD, Franklin GA, Boaz PW, et al**. A multicenter evaluation of whether gender dimorphism affects survival after trauma. *The American Journal of Surgery*. 2001;181(4):297-300. doi:10.1016/S0002-9610(01)00582-7

**2. Tascu A, Pascal C, Iencean StM, Gorgan MR.** Aggressive or conservative management in extradural hematomas in children – a challenging neurosurgical choice. *Romanian Neurosurgery*. 2014;21(4):385-394. doi:10.2478/romneu-2014-0054

**3. Araujo JLV, Aguiar UDP, Todeschini AB, Saade N, Veiga JCE**. Análise epidemiológica de 210 casos de hematoma extradural traumático tratados cirurgicamente. *Rev Col Bras Cir*. 2012;39(4):268-271. doi:10.1590/S0100-69912012000400005

**4. Wen L, Li QC, Wang SC, et al.** Contralateral haematoma secondary to decompressive craniectomy performed for severe head trauma: A descriptive study of 15 cases. *Brain Injury*. 2013;27(3):286-292. doi:10.3109/02699052.2012.743180

**5. Anwer M, Rehman AU, Ahmed F, Kumar S, Uddin MM.** Delayed Extradural Hematoma after Evacuation of Contralateral Acute Extradural Hematoma. *Indian Journal of Neurotrauma*. 2021;18(01):59-62. doi:10.1055/s-0040-1713722

**6. Borovich B, Braun J, Guilburd JN, et al**. Delayed onset of traumatic extradural hematoma. *Journal of Neurosurgery*. 1985;63(1):30-34. doi:10.3171/jns.1985.63.1.0030

**7. Bricolo AP, Pasut LM.** Extradural Hematoma: Toward Zero Mortality. *Neurosurgery*. 1984;14(1):8-12. doi:10.1227/00006123-198401000-00003

**8. Babu, M. L., Bhasin, S. K., & Kumar, A.** . Extradural hematoma-an experience of 300 cases. *JK Science :* 2005, *7*(4), 205-7.