

# A Rural Area Problem Of Large Epidural Hematoma With Herniation

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## Abstract

The shortage of ICU ward was one of the problem in rural areas like Bogor Residence, West Java, Indonesia. Untreated EDH can progress to coma and eventually death. Here, we describe three cases that had been delayed a couple days for an operation and still be able to go home with good outcome. 14 years-old boy came to emergency department with a decrease of consciousness 2 day before. His GCS was 10 and CT showed large left frontal epidural hematoma with falcine herniation. The hematoma removal done the next day after admission. The patient went home without neurological deficit. Conclusion. Delay in treatment has been shown to increase the mortality rate especially with large epidural haematoma. But, this young patient recovered fully after several days brain herniation.

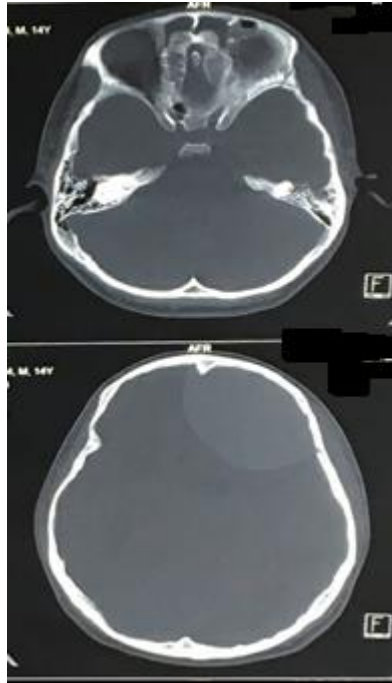
Keywords. Delayed Surgery, Epidural Hematoma, Falcine Herniation, Young Patient

## 1. Introduction

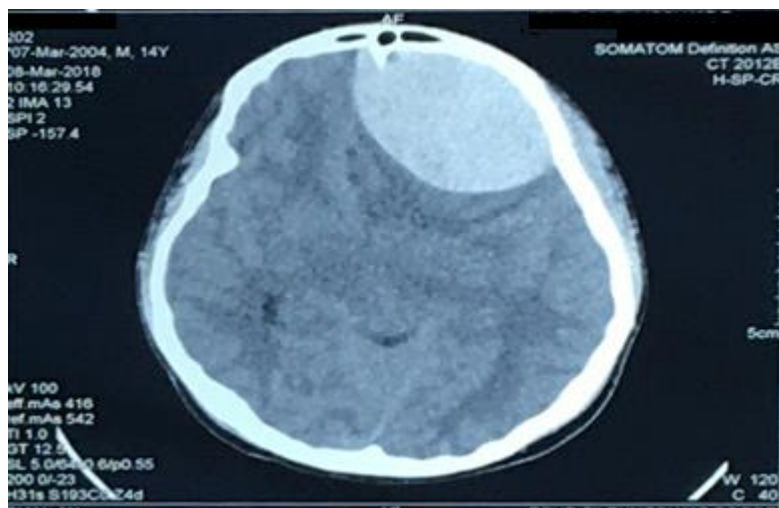
Acute epidural hematoma occurs in 2.7 % to 11 % of traumatic brain injuries (TBIs)(1). Epidural or extradural hematoma (EDH), which is a collection of blood between the inner table of skull and dura mater occurs in 1% - 5% of TBI. The classical presentation of EDH comprises a brief loss of consciousness (LOC), followed by a lucid interval of several hours, then, obtundation with focal neurologic signs. Untreated EDH can progress to coma, and eventually death. Here, we describe a common delayed case In Indonesia. However, the patient still ables to go home with good outcome.

## 2. Case Presentation

1.14 years-old boy came to emergency department with a decrease of consciousness. He had motor vehicle collicion 2 dayw before. He was alert when he fell off; then somebody brought him to the public health center. The doctor there examined him and sent him home. The boy vomited twice and after that he was unconscious and his family brought him to the hospital. General examination : GCS was 10 and he was able to move all 4 limbs. His pulse was 56x/min and BP 130/80 mmHg. Imaging examination with CT scan had been done within 6 hours in the emergency ward (**Figure 1, 2**).



**Figure 1. Epidural Hematoma with left frontal fracture in CT Imaging**



**Figure 2. Large Epidural Hematoma on Left Frontal Region. There was mass effect, effacement of the left ventricular system, and 1 cm of left-to-right midline shift**

There were fractures over frontal and temporal bone. There was a large epidural hematoma at left frontal with falcine herniation. The patient was informed to have an operation. While waiting for an operation, he was given intra-venous mannitol (4x200 cc) and sedation with midazolam. There was no history of bleeding disorder. His coagulation work up was normal. Evacuation of the hematoma was done through left frontal craniotomy. Intraoperative findings there was a fracture and bleeding from the middle meningeal artery.

He recovered fully and was discharged on the 7th postoperative day. He returned to school two weeks after the injury. At his last follow-up examination, 6 months after the injury, he had no physical or cognitive deficits.

2. Male, 25 years old, was referred to our hospital after two days waiting in Emergency Ward. When he came his GCS score was E1M4V2, BP 130//80 mmHg, HR=98x/minute, CT scan showed there was large epidural hematoma left temporoparietal regions, with central herniation. He was operated by the third day and. Day one post operative he was respiratory distress (40x/minute), HR=183, BP 130/79 mmHg, post operative day 2, his hemoglobine level was 8.3 and trombocyte level 54000, GCS was improved e3M6Vstillon ETT,HARI=123x/m, BP 123/74 mmHg, he was transfused by FFP and PRC. His HB 9.7mmHg and 110.000 .mm3 (thrombocyte level).Post operative day3 he was extubated and he was discharge in post operative day 8.

3.Male, 17 yearsold, he came to the hospital in the evening because of falling from the roof of his house. He vomited several times and had headache after discharge from the hospital because of the finansial restraint in the morning. He was alert,but complained of headache. He was discharge from the hospital after two days admission. The next week he came with headache continuously all over his head. His CT scan showed large epidural hematoma in his left parietal. By the third week after the trauma, he finished of his national health coverage. He was performed craniotomy and went home in uneventful condition.

### 3. Discussion

Traumatic brain injury (TBI) is defined as an acute injury to the head caused by blunt or penetrating trauma or from acceleration/deceleration forces excluding degenerative, congenital problems(1, 2) A well recognized secondary insult of TBI is epidural hematoma (EDH), which is classically considered to be an acute complication of TBI whose maximum development takes place immediately following trauma.

#### *Fatality of Epidural Hematoma in Trauma*

Hemorrhage and hematoma formation result from tearing of blood vessels at the moment of head impact. The hemorrhage may accumulate slowly and not be clinically manifest until hours or days after the initial injury (1). In patients with severe TBI, autoregulation does not work due to pathologic increase in ICP. Two major factors that lead to elevated ICP are mechanical and vascular effect. When a mass lesion develops, a pressure gradient occurs, that cause displacement of the brain tissue and inducing brain herniation. Herniation should be treated immediate(1)ly to prevent irreversible and fatal damage to the brain stem. It increases high blood pressure, makes an irregular or slow pulse, headache, weakness, loss of consciousness, and respiratory arrest.

Vascular effects of increased ICP are caused by reduced CPP, which is caused by decreased mean arterial pressure (MAP) or increased ICP. As the CPP decreases, CBF may become insufficient for adequate brain-tissue perfusion and oxygenation(3, 4).Ischemia will induce further cytotoxic edema and result in even higher ICP. A CPP less than 60 to 70 mmHg is associated with diminished oxygenation and altered metabolism in brain parenchyma.

#### *Time gap between trauma and the onset of DC*

The Brain Trauma Foundation Guidelines for the surgical management of TBI, both surgical EDHs and subdural hematomas (SDHs), state that epidural hematomas should be operated on as soon as possible.(5) This recommendation is based on a number of studies that found a positive association between better outcome and shorter delay to surgery.

For EDH, a study established a link between the onset of loss of consciousness and outcome, with only a 3% mortality rate when the patients were conscious at the time of start of surgery. In patients who were initially conscious but became unconscious prior to surgery, however, the mortality rate was 28.6%, similar to that for patients who had been unconscious since the onset of trauma.(6) Likewise, Haselsberger et al(7).found that a delay of less than 2 hours between the onset of coma and surgery was associated with a 17% mortality rate and good recovery in 67%, compared with 65% and 13%, respectively, when the delay was more than 2 hours.

For the general trauma population, delay in treatment has been identified as one of the major causes of death(8).Furthermore, delay in transferring severely injured patients directly to a trauma facility has been shown to increase their mortality and morbidity.(9)Another study, looking at all critically ill ED patients awaiting transfer to an intensive care unit, found that a delay of 6 or more hours for transfer

was associated with a higher mortality rate, and a longer length of stay in the intensive care unit and in the hospital. (10)

#### *Delayed Surgery of Epidural Hematoma in Young Patient*

Surgical evacuation of Epidural Hematomas was delayed in this patient because of late arrival due to difficult transportation to reach health facilities. However, this is lower than the average timelag of 94.2 hours between TBI and surgery reported by Mezue et al in Nigeria.(11). The condition in Indonesia is quite similar to what happened in Nigeria where poor transportation facilities, poor organization of the health care system, low income. This condition delays patients to reach appropriate health care in time.

Regarding the GCS is a major prognostic factor for the outcome of patients with traumatic Epidural Hematomas. This patient's GCS upon admission was 10. As series done by Ndoumbe(12) GCS 9-13 mortality was 0.833 %.

The reason why this patient survived after cerebral herniation due to epidural hematoma was (a) Some traumatic lesions, such as epidural and subdural hematomas, merely compress the brain and raise the intracranial pressure. These lesions are different than contusion cerebral or intracerebral hemorrhage that damage the brain. (13). This could be the plausible explanation of good recovery after epidural hematoma injury in this patient. (b) Survival with good outcome after cerebral herniation and Duret hemorrhage was shown by Stiver SI (14). A young patient was survived after aggressive ICP monitoring and treatment Duret hemorrhage. This article was not clearly stated the reason why the patient has good recovery (c) A study done by Andrews BT age, level of consciousness, and the degree of residual upper brain stem function at admission appear to be the most important determinants of functional outcome after traumatic transtentorial herniation. (15). That is why this 14 year old patient has good recovery after subfalcine herniation because of young, moderate head injury and no brainstem disfunction.

#### **4. Conclusion**

Delay in operation of epidural hematoma has been shown to increase their mortality and morbidity. This case describes a patient with large frontal epidural hematoma that herniated, but still this patient recovered without neurological deficit. This case warrants further study that investigate factors that influence good recovery of young patient after brain herniation due to epidural hematoma.

#### **Acknowledgement**

Special thanks to district Cileungsi general local hospital for medical ethics approval and medical records data collection.

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