

Outcomes of Extradural Hematoma in Head Injuries

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ABSTRACT

Background: Head injury is public health threat that is recognized as causing death and impairment. It reflects a deplorable financial burden on developing countries.

Objective: The aim of the present study was to evaluate surgical outcomes of traumatic extradural (or epidural) hematoma (EDH).

Patients and methods: this study included 100 cases with acute traumatic extradural hematoma who admitted to Neurosurgery Department, Zagazig University Hospitals. Glasgow coma scale score was assessed pre- and postoperatively.

Results: The mean age of the studied patients was 35.2 ± 15.9 , 66% of cases were males. According to the mechanism of trauma, 33% had road traffic accidents, 64% had head injury from fall and 3% had head injury from assault among studied patients. Regarding site of hematoma, 15 % was frontal; 36% was temporo-parietal; 33% was posterior fossa. The mean hospital stay was 14.2 ± 5.6 days.

Conclusion: The prognosis of patients with DEH has been shown to be improved by early diagnosis and immediate treatment.

Keywords: Extradural hematoma, GCS, Outcomes.

INTRODUCTION

Blood that has accumulated extra-axially within the potential space between the dura mater's outer layer and the inner table of the skull is called an epidural hematoma (EDH)⁽¹⁾. The lateral sutures, particularly the coronal sutures where the dura enters, contain it. It is a potentially fatal illness that may call for prompt treatment and, if neglected, is linked to severe morbidity and death. For a positive result, prompt diagnosis and evacuation are essential^(2,3).

EDH occurs in 10% or more of traumatic brain injuries (TBI) that need hospitalisation. Both traumatic and non-traumatic procedures can cause an epidural hematoma. The majority of instances involving traumatic mechanisms are the result of brain injuries caused by vehicle accidents, physical assaults, or inadvertent falls. Non-traumatic causes include infection, coagulopathy, hemorrhagic tumours, and vascular anomalies^(4,5).

In 2% of all head injuries and up to 15% of all fatal head traumas, an epidural hematoma develops. Males are afflicted more frequently than females. Additionally, the incidence is greater among young people and teenagers. Patients who are afflicted on average are between 20 and 30 years old, and it is uncommon after the age of 50 to 60. The dura mater adheres to the underlying bone more firmly as a person ages. This reduces the possibility that a hematoma may form in the region between the dura and the skull⁽⁶⁾.

According to radiographic progression, EDH is divided into three categories: Type I: Acute, which develops on day 1 and is associated with a "swirl" of unclotted blood; Type II: Subacute, which develops between days 2 and 4 and is typically solid; and Type

III: Chronic, which develops between days 7 and 20 and has a mixed or lucent appearance with contrast enhancement⁽⁷⁾.

Rapid diagnosis and evacuation of EDH are important for a good outcome. This condition should be considered to properly evaluate it. Therefore, this study aimed to evaluate the surgical outcomes of EDH.

PATIENTS AND METHODS

This study included 100 cases with traumatic extradural hematoma who were admitted to Neurosurgery Department, Zagazig University Hospitals.

Inclusion criteria:

Patient with acute traumatic extradural hematoma of both genders and their age ranged from 18 to 50 years. The presentation of symptoms depend on how quickly the EDH was developing within the cranial vault. A patient with a small EDH may be asymptomatic, but this is rare. Also, an EDH may also develop in a delayed fashion.

CT Scan

CT scan is applied to all studied imaging modality to assess for intracranial bleeding. Its popularity is related to its widespread availability in emergency departments. The majority of EDHs are identifiable on a CT scan. The classic presentation is a biconvex or lens-shaped mass on brain CT scan, due to the limited ability of blood to expand within the fixed attachment of the dura to the cranial sutures. EDHs do not cross suture lines.

Other CT findings may need to be taken into account when evaluating EDH. For example, continued bleeding may be indicated by areas of low density, or a

"swirl-sign". The latter may be used for prognosis, and often indicates the need for surgical intervention. If the EDH abuts brain tissue that is hemorrhagic or contused, it may appear shallow, and thus, may be overlooked if the CT scan is not carefully examined.

Magnetic resonance imaging (MRI)

Brain MRI is applied to the studied patients because it is more sensitive than a CT scan, particularly when assessing for EDH in the vertex. It should be obtained when there is high clinical suspicion for EDH, accompanying a negative initial head CT scan. In the situation of a suspected spinal EDH, a spinal MRI is the preferred imaging modality, as it affords higher resolution versus a spinal CT.

Angiography

When evaluating EDHs located in the vertex, the healthcare professional should evaluate for the presence of a dural arteriovenous (AV) fistula that may have arisen from the middle meningeal artery. Angiography may be required to evaluate the presence of such a lesion fully.

Ethical Consideration:

The Academic and Ethical Committee of Zagazig University approved the project. All of the subjects' written informed permission was acquired. The Declaration of Helsinki, the World Medical Association's code of ethics for studies involving humans, guided the conduct of this work.

Statistical analysis

Data collected and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) software for analysis. According to the type of data, qualitative were represented as number and percentage and quantitative continues group were represented by mean ± standard deviation (SD).

RESULTS

The basic characteristics of the studied patients are shown in table 1. Fall was the most common mechanism of trauma.

Table (1): Basic characteristics of the studied patients

Variable	N= 100
Age (years) Mean ± SD	35.2± 15.9
Sex Male, n (%) Female, n (%)	66 (66%) 34 (34 %)
Mechanism of trauma Road traffic accident Fall Assault	33 (33%) 64 (64 %) 3 (3%)

Regarding site of hematoma, temporo-parietal was the most common site (Table 2). The mean hospital stay was 14.2±5.6 days (Table 3).

Table (2): Site of hematoma among the studied patients

Site of hematoma	N= 100
Frontal	13 (13 %)
Parietal	10 (10 %)
Temporal	17 (17 %)
Temporo-parietal	32 (32 %)
Occipital	16 (16%)
Posterior fossa	8 (8%)

Table (3): Hospital stay among the participants

Variable	N= 100
Hospital stay (days) Mean ± SD	14.2±5.6

CASE 1

A male patient, 21 years old, had a previous past history of appendectomy from 10 years. His Glasgow Coma score 10/15, FMP, rhinorrhea and otorrhea. He was diagnosed by CT as it was showing EDH. He underwent evacuation of the hematoma (near the orbit) operation. He was admitted for 25 days and was discharged when he was vitally stable on oral feeding and the wound was clean and clear. He was on ambezim tab oral, ipantin 100 mg twice daily, diclac 150 mg every 3 days (Figure 1).

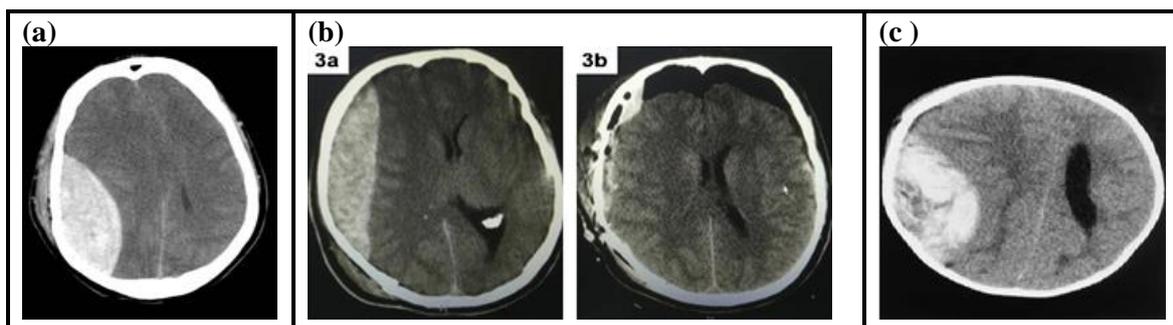


Figure (1): A male case with EDH showing (a) CT pre-treatment; (b) intraoperative of extradural hemorrhage; (c) postoperative CT

CASE 2

A male patient, 19 years old, came to the emergency room complaining of repeated vomiting. No medical history of diabetes or hypertension. The medical examination found that he was stable with intact sensation, FC, FMP, pupil ERRR, intact sphincteric. CT showed extradural hematoma rim. He was treated conservatively by analgesics, antiepileptics, antibiotics, PPI, dicyclonine, capron, vitamin K, and antiemetics (**Figure 2**).

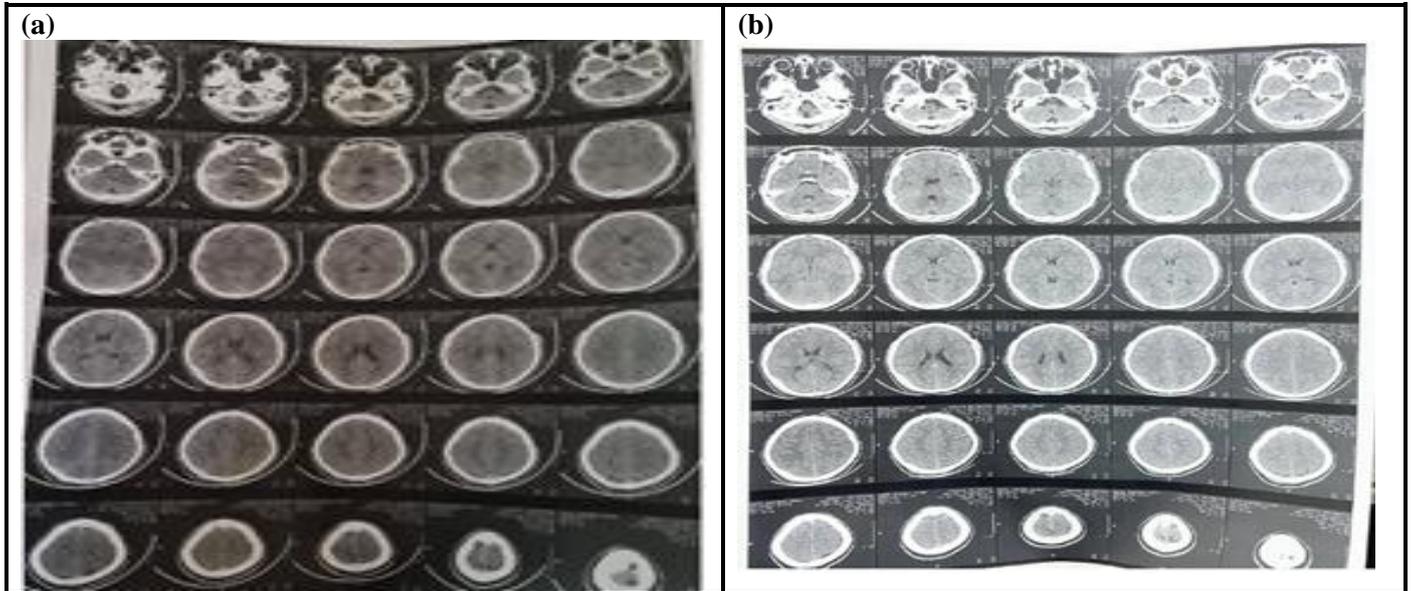


Figure (2): A male case with EDH showing (a) Extradural hematoma rim; (b) CT post treatment results

CASE 3

A female patient, 1 year old, came to the emergency room complaining of repeated vomiting. On examination, she was active, alert and crying. CT showed extradural hematoma. She was diagnosed with extradural hematoma. She was treated by evacuation of the hematoma (**Figure 3**).

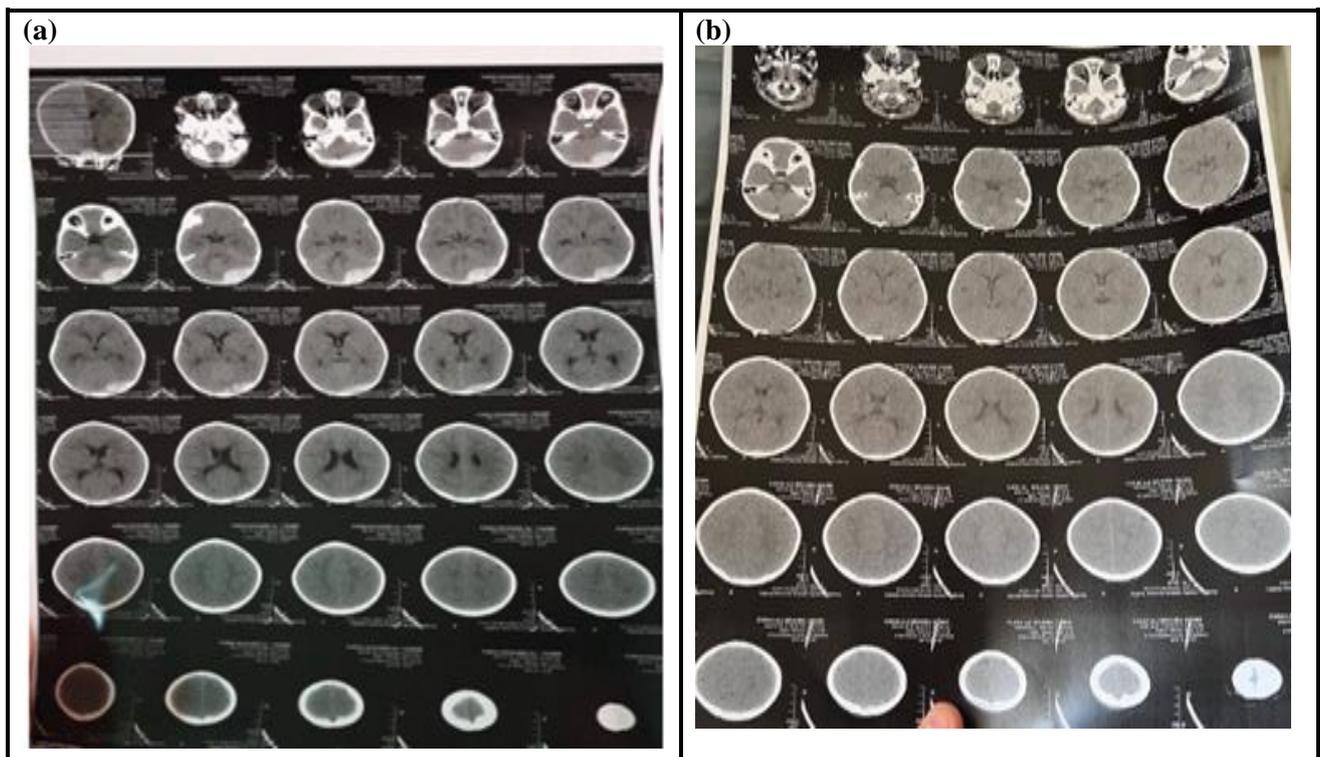


Figure (3): A case of female, one year old, showing (a) Extradural Hematoma; (b) postoperative results

DISCUSSION

A neurosurgical emergency is EDH. In order to avoid permanent brain damage and death as a result of hematoma enlargement and herniation, it urgently requires surgical evacuation. Since it's crucial to act within 1 to 2 hours after presentation, neurosurgical guidance should be sought out immediately ⁽⁸⁾.

The airway, breathing, and circulation (ABCs) should be quickly attended to in order to stabilise the patient. In patients with acute EDH and hematoma volume more than 30 ml, surgical surgery is advised regardless of Glasgow coma scale (GCS) grade ^(9,10).

Cryotomy and hematoma evacuation are the main treatments for individuals with acute and symptomatic EDHs. However, if it is possible, doing a craniotomy can offer a more complete evacuation of the hematoma ⁽⁷⁾.

According to our study, patients with pure EDHs have an excellent prognosis of a functional outcome after the surgical evacuation, when it is rapidly detected and evacuated. A delay in diagnosis and treatment increases morbidity and mortality ⁽⁸⁾.

EDHs caused by arterial bleeding develop rapidly and can be detected quickly. But those due to a dural sinus tear develop more slowly. Thus, clinical manifestations may be delayed, with a resultant delay in recognition and evacuation. Generally, an EDH volume greater than 50 cm prior to evacuation results in a worse neurological outcome and consequent mortality ^(11,12).

In the study by **Basamh et al.** ⁽¹³⁾, one or both unreactive pupils were significantly associated with poor outcome. The multivariate analysis of our patients confirmed that pupillary reactivity influenced hospital mortality but there was no influence on long-term outcome.

Heinzelmann et al. ⁽¹⁴⁾ found that extracranial injuries had no significant effect upon outcomes of patients with EDH.

It has been hypothesized that dural-based vessels might be more easily torn or avulsed due to deformation of the skull in younger patients, because the dura becomes increasingly adherent to the skull with advanced age, which reduces the risk of epidural hematoma. Although the results showed no relation between the GCS score and EDH, this scale is useful to evaluate the status of patients with brain injury and to improve outcomes ^(15,16).

CONCLUSION

Extradural hematoma affected males more commonly and the better outcome achieved when the initial GCS was in the higher range. The prognosis of patients with DEH has been shown to be improved by early diagnosis and immediate treatment.

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