Research Article

Urgency for surgical evacuation of post traumatic Intracranial acute epidural hematoma

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Abstract

Introduction: Intracranial epidural haematoma, (EDH) is a collection of blood between the skull and dura mater due to head injury. It is considered to be the most serious complication of head injury requiring immediate diagnosis and surgical intervention. **Background:** The aim of our study was to present the outcome of consecutive patients with Acute EDH managed surgically & to prove the high risk of death or permanent brain damage without prompt surgical intervention. **Method:** In this study we retrospectively examined all consecutive head injury cases managed between September 2014 & September 2015 and diagnosed with acute traumatic epidural hematoma in isolation or in combination with intra cranial lesions. Age, sex, mechanism of injury, time of presentation, Glasgow Coma Score (GCS), pupil reactivity, time of surgery and clinical outcomes were evaluated. **Results:** Out of 31 cases 87%, (n=27) were males and 13 %,(n=4) were females. The mean age was 17.75 years. 74% (n=23) patients under the age of 25years. The most common mode of injury was road traffic accident 48%, (n=15) followed by fall 42%, (n=13). The mortality rate was 6% (n=2). The time interval between trauma & operation of both patients who died were more than 8 hours. **Conclusions:** An acute epidural hematoma is an emergency condition, the diagnosis of the EDH must be promptly made by CT scan and the patient should be immediately transferred into a neurosurgical centre, Early surgical intervention is associated with the best outcome.

Keywords: Intracranial Epidural Haematoma, Brain Damage, Craniotomy, Dura Mater, Middle Meningeal Artery, Mechanism of Injury.

Introduction

Intracranial epidural haematoma, (EDH) is a collection of blood between the skull and dura mater due to head injury. EDH mostly results from injury of the middle meningeal artery. Also, injury of the middle meningeal vein, diploic veins, or dural venous sinuses may lead epidural hemorrhage [1]. The incidence of EDH among traumatic brain injury (TBI) patients has been reported to be in the range of 2.7 to 4% [2]. Mortality rate associated with EDH are 20% [3]. The early mortality rate was 86% [4], which has reduced now by introduction of CT and proper resuscitative measures and timely surgical intervention. EDHs are nearly always caused by, and located near a skull fracture. The collection takes several forms in terms of size, location, speed of development and the effect they exert on patients. EDH usually forms within a matter of hours from the time of injury but sometimes run a more chronic course, being detected only days after injury [6].

A lot of factors acting independently affect outcome in patients with acute traumatic EDH. Admission Glasgow Coma Score (GCS) and the presence of associated intracranial lesions appear to be the most important predictors of outcome. Other risk factors that may affect the eventual outcome of EDH are age of the patient, temporal or posterior fossa location, time interval between injury to surgical procedure, immediate coma

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or lucid interval, pupillary abnormalities, focal deficits on admission, CT findings (hematoma volume, degree of midline shift, signs of active bleeding). Patients who have higher EDH volumes usually have a worse prognosis. [7].

The standard recommendation for symptomatic patients is surgical intervention within the golden hours [5]. The preferred surgical intervention for EDH is craniotomy and evacuation of hematoma. However, neurosurgical service in Oman is still evolving and as such, there tends to be an unacceptable delay before an appropriate referral of patients to a competent neurosurgical centre. In developing countries with inadequate manpower and lack of essential diagnostic imaging support services, factors like late recognition and delay in seeking proper expert intervention may also indirectly affect the outcome in these patients.

The aim of our study was to determine the independent influencing factors, Present the outcome of consecutive patients with acute EDH managed surgically & to prove the high risk of death or permanent brain damage without prompt surgical intervention.

Methods

The study is a retrospective analysis of prospectively collected data between September 2014 and September 2015, 31 patients were diagnosed with acute traumatic epidural hematoma in isolation or in combination with intra cranial lesions & surgically managed at the department of neurosurgery, Khoula hospital, Ministry of health Muscat Oman. All patients categorised & evaluated according to age, sex, mechanism of injury, time of presentation, Glasgow Coma Score (GCS), pupil reactivity, time of surgery and clinical outcomes. All the patients were treated in accordance with a standard advanced trauma life support protocol if they presented directly to the emergency department of our hospital. A meticulous physical examination, with an emphasis on neurological function, was performed on admission. The diagnosis of acute EDH was confirmed by CT scan. All the cases were operated on emergency basis, Decision for surgical treatment was based on the patient's clinical condition, GCS score, evidence of midline shift on the initial head CT scan and the size of hematoma.

We excluded from this study patients with small EDH managed with observation & conservative treatment, Patients with spontaneous epidural hematoma and patients with acute EDH as complication of elective craniotomies. The data were analyzed using Microsoft Excel2013 and IBM SPSS Statistics 21.0.

Results

There were 31 acute EDH patients from September 2014 and September 2015, surgically managed at the department of neurosurgery, Khoula hospital, Ministry of health Muscat Oman. Out of 31 cases 87%, (n=27) were males and 13 %,(n=4) were females. The mean age was 17.75 years. 94% (n=29) patients under the age of 35years. We found the most common mode of injury was road traffic accident 48%, (n=15) followed by fall 42%, (n=13). Most common clinical presentation was headache/vomiting 58%, (n=18) followed by altered sensorium (n=7). 8 patients were deeply unconscious at the time of admission, while 8 patients (26%) had pupillary abnormalities.

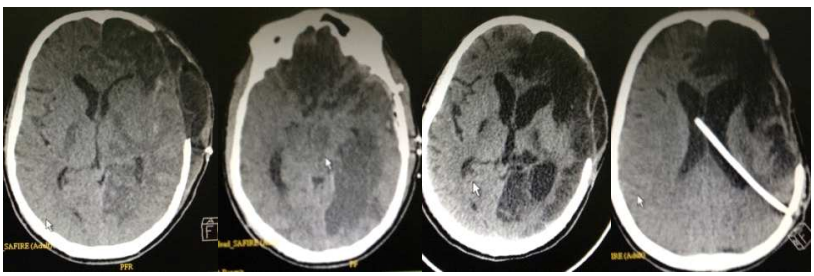
According to CT finding, temporoparietal site was involved in 42% (n=13) followed by frontal region in 29% (n=9). Two patients (6%) had EDH in posterior fossa. Associated extra cranial injuries (Long bone fracture, maxillofacial injury, Lung contusions) were present in 29% (n = 9) cases.

Out of 31 patients 65%, (n=20) were referred from peripheral centre (most of them are situated 2-4hours drive from Khoula hospital), As Khoula hospital is a tertiary care referral hospital. All the cases were operated on emergency basis. Surgical management consisted of craniotomy under general anesthesia and removal of the hematoma. The mean time of interval between trauma & operation was 6.38 hours. In terms of the Glasgow Coma Scale, 87%, (n=27) patients presented complete recovery, while two patients 6% had severe neurological sequelae. The mortality rate was 6% (n=2).

The time interval between trauma & operation of both patients who died more than 8 hours & they transferred from Peripheral centre.

Table I: Demographic and clinical data of acute traumatic EDH.

Features	Number (n)	Percentage
No. of patients	31	
Sex		
Male	27	87
Female	04	13
Age (mean age 17.75)		
0 to 2 years	02	6
3 to 16 years	10	32
17 to 35 years	17	55
36 to 60 years	02	6
61 and more	0	0
Mode of injury		
Fall from height	13	42
RTA	15	48
Assault	01	3
Fall of heavy object on head	02	6
Site of EDH		
Teporoparital	13	42
Frontal	09	29
parital	03	10
Temporal	02	6
Occipital	02	6
Posterior fossa	02	6
On arrival GCS		
13 to 15	19	61
10 to12	04	13
7 to 9	06	19
3 to 6	02	6
Time interval between trauma & Operation		
0 - 4 hours	12	39
5 - 8 hours	14	45
9 hours and more.	05	16
Deaths	2	6



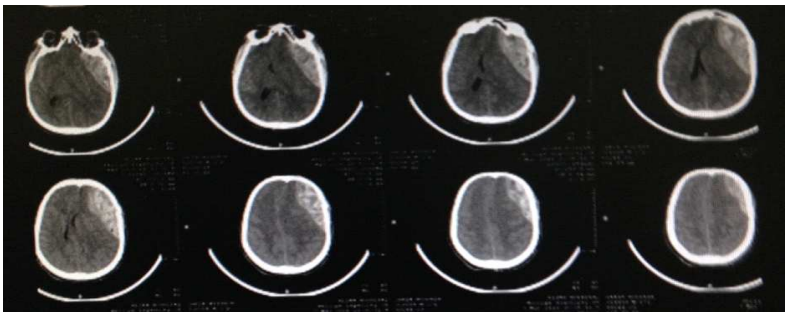


Figure 1 & 2: 27 years old patient, transferred from peripheral hospital with the diagnosis of traumatic acute EDH, operated after 9 hours of head injury, Post op scan showed ipsilateral brain infarction, Further decompressive craniectomy obtained, late developed hydrocphalus. VP shunt inserted. Patient remains in vegetative status.

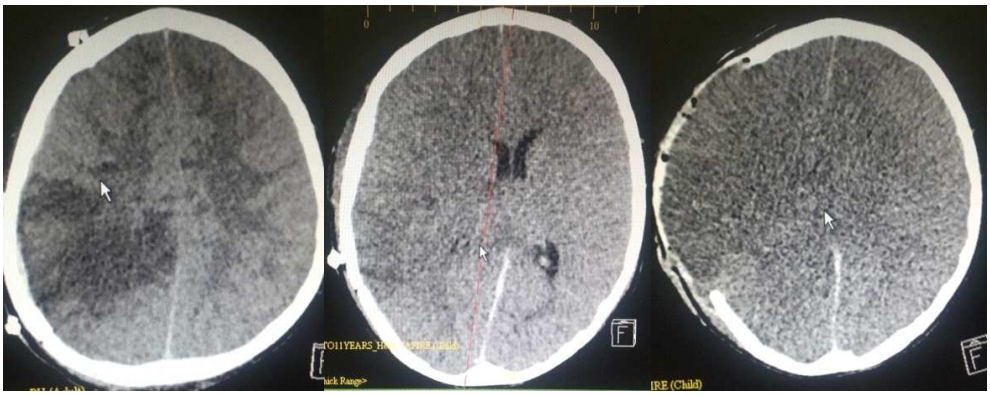


Figure 3: 9 years old boy. Operated for acute EDH after 11 hours of head injury. extensive brain infarcts deep the site of operated EDH. patient died.

Discussion

The classical clinical presentation of EDH includes a brief posttraumatic loss of consciousness, followed by a "lucid interval" of variable duration and then headache, depressed conscious state, contralateral hemiparesis and ipsilateral pupillary dilatation. Deterioration usually occurs due to a cerebral herniation. Clinical findings are highly variable, often unreliable for EDH and can delay the diagnosis, the diagnostic method of choice being the CT scan [8].

This study include only surgically managed cases of traumatic acute EDH. The acute epidural hematoma considered as a neurosurgical emergency and an urgent evacuation was recommended, The delayed diagnosis and treatment of EDH are related to increased mortality and worse functional outcome [7]. The aim of our study was to present the outcome of consecutive patients with Acute EDH managed surgically & to prove the high risk of death or permanent brain damage without prompt surgical intervention.

Road traffic accident are the predominant predisposing factors in our study, accounting for 48% of patients. This reflects the serious impact of road traffic accident in our society. Since this factor is eminently preventable by proper enforcement of driving regulations, coordinated efforts may significantly reduce the rate of head trauma generally. Studies in pediatric populations indicate a high incidence of falls [9] and this is also modifiable.

Admission GCS is one of the most important predictors of eventual patient prognosis, outcome being better when the initial GCS is high [10]. In our study 20 patients shows best outcome with GCS ≥10.

There is an established relationship between outcome of patients and the time lag between injury and surgical intervention. Surgical decompression should be carried out within 240 min (4 h) of the onset of significant symptoms in order to ensure good result [11]. Our study strongly supported for these recommendations. Five patients with GCS between 7 to 9, Operated within 2-4 hours of injury & showed good outcome. One patient who was transferred from peripheral hospital,

developed severe neurological deficit, He was operated after 9 hours of head injury, Post op scan showed ipsilateral brain infarction, a further decompressive craniectomy was performed, This patient later developed hydrocphalus and a VP shunt had tobe inserted, He remains in vegetative status.

The overall mortality rate from this study was (6%) as compare to some other studies, Chowdhury et al reported 8% mortality, While Bricolo et al reported 14% mortality [6,10]. These findings could largely be explained by delayed presentation to neurosurgical centre. In our study the time interval between trauma & operation of both patients who died more than 8 hours & they also transferred from Peripheral centre.

Conclusion

We conclude that the acute epidural hematoma is an emergency condition, appears more often in males, The diagnosis of the EDH must be promptly made by CT scan and the patient should be immediately transferred into a neurosurgical centre, Early surgical intervention is associated with the best outcome.

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Permission of IRB: Yes

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