Clinical Medicine and Health Research Journal (CMHRJ) ISSN: 1694-4305
Volume 03, Issue 04, July - August, 2023
Page No. 460-463, https://doi.org/10.18535/cmhrj.v3i4.196

Research Article

Surgical Management of Acute Extradural Hematoma in Bauchi Nigeria: Challenges and Outcomes

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Received: 01 June, 2023 Accepted: 02 July, 2023 Published: 07 July 2023

Abstract:

Introduction: Acute extradural hematoma (EDH) is a neurosurgical emergency and can be life threatening in many occasions. It is defined as a collection of blood within the dura matter and inner table of the skull. We aimed to study the incidence and outcomes of acute EDH managed in our facility

Materials and Methods: Ninety seven consecutive patients managed surgically for acute extradural hematoma (EDH) within 4 years. Demographic data, time of presentation, GCS score and Glasgow outcome score (extended) were analyzed.

Results: Acute EDH has yearly occurrence of 24.3 per year. Out of 97 cases 89 % were male and 11% were female. The male and female ratio was 7.8: 1. Commonest age group was 21 to 30 years. Commonest mode of injury was Road traffic Accident 59.8%, followed by Assaults. Most common clinical presentation was headache (74.2%) followed by altered consciousness (38%). In this study of 97 cases of EDH, frontal site was involved in 26% followed by parieto-temporal region in 22%. 90% of the patients had favorable outcome while the mortality rate was 3.1%.

Conclusion: Acute Extradural hematoma is a neurosurgical emergency where the admitting GCS score and early surgical intervention is associated with favorable outcome. Legislation and optimal social amenities will reduce the incidence of traumatic brain injury and improve the surgical outcome of acute EDH..

Keywords: Extradural hematoma, brain injury, outcome

Introduction

Acute extradural hematoma (EDH) collection is a neurosurgical emergency and can be life threatening in many occasions. It has been adjudged to be one of the most rewarding responsive traumatic lesions treated by neurosurgeons. It is defined as a collection of blood within the dura matter and inner table of the skull (1). EDH can results from injury to the middle meningeal vessels, the diploic veins or the venous sinuses. Historically, bleeding middle meningeal artery considered as the main source for EDH. Arterial bleeding identified as the source of EDH in 36% of adults and in 18% children with EDH (2, 3). Extra dural hematomas 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 (4).

The peak incidence of acute extradural hematoma is in the second decade of life with the mean age between 20 and 30 years (2-5). Acute EDH occurs in 1-3% of patients with closed head injuries and in up to 15% of patients with severe head injury (6). Extradural hematoma is very rare in extreme age.

Computerized tomography (CT) scan is the imaging modality of choice for diagnosing EDH (7). With the advent of CT, proper resuscitation and prompt surgical intervention, the mortality rate has been reduced to 5 -12% from initial 86% (8). The prognosis of surgical management of acute EDH depends on so many factors among which are; patient's age, size of hematoma, location of hematoma, timing of intervention, the rapidity of the symptoms and neurological status (9).

We reported and analyzed 97 consecutive patients with acute EDH and subsequent had surgical evacuation over a period 4 years. The study is aimed to present challenges we encountered while caring for these patients in our facility and surgical outcomes.

Materials and Methods

This study includes 97 consecutive patient that underwent craniotomy and evacuation for acute extradural hematoma (EDH) between September 2018 and September 2022 in Abubakar Tafawa Balewa University Teaching Hospital,

Bauchi, Nigeria. Age, sex, mechanism of injury, time of presentation, clinical presentation, Glasgow coma score (GCS), location of hematoma and outcomes of each of the patient were reviewed. Data were obtained from the patients' case folders and operation notes with the aid of structure questionnaire.

Results

Two thousand nine hundred and one patients presented with head injuries to our hospital within the study period of 4 years. Ninety seven patients had surgical evacuation of acute extradural hematoma with a mean yearly occurrence of 24.3 per year. The mean age of our patients was 27.3 years while the peak incidence age range was 21-30 years. 86% of the patients were 40 and below in age. There were 86 (89%) males and 11 (11%) females. Male to female ratio of 7.8:1(Table 1). The proportion of the etiological causes were as follows; RTA (60%), assault (17.5%), fall from height (14.4%) and 8.3% for fall into depth (Table 2).

Figure 1 shows the various time of presentation of the patients to our facility, majority of them (91%) presented after 24hours post trauma and out of this, 15% presented after a week. Most common clinical presentation was headache in 72 (74.2%) of the patients, followed by altered consciousness (38%). Neurologic deficit and lucid interval were 23.7% and 10.3% respectively (Table 3)

Table 1: Age and gender distribution, (n=97)

Variable	Number (%)
Age ranges (years)	
0-10	6 (6)
11-20	23 (23.7)
21-30	30 (31)
31-40	27 (28)
41-50	10 (10.3)
>50	1 (1)
Gender	
Male	86 (89)
Female	11 (11)

Table 2: Aetiology of the injury

Aetiology	Number (%)
Road traffic accident (RTA)	58 (59.8)
Fall from height	14 (14.4)
Fall into depth	8 (8.3)
Assault	17 (17.5)

Table 3: Clinical presentations

Clinical features	Number (%)
Headache	72 (74.2)
Seizure	6 (6.2)
Lucid interval	10 (10.3)
Altered consciousness	37 (38)
Loss of consciousness	15 (15.5)
Neurologic deficit	23 (23.7)

Among the 97 patients, acute EDH was located in 26% in frontal, 22% (parietal), 22% (parieto-temporal) and only 2% had it located in occipital region (Figure 2). At presentation, the level of severity was GCS 3-8 (9.3%), GCS 9- 12 (46.4%) and GCS 13-15 (44.3%). About 90% had favorable outcome post-surgical intervention. Three deaths were recorded accounted for 3% (Figure 5).

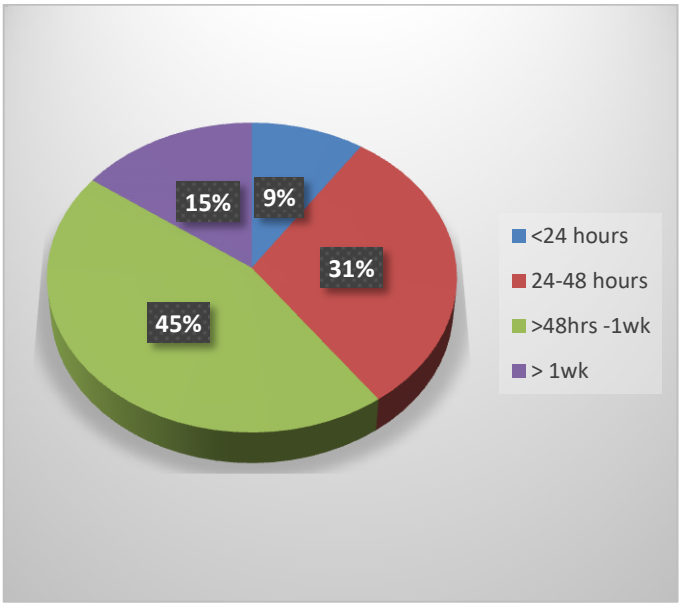

Figure 1: Time of presentation

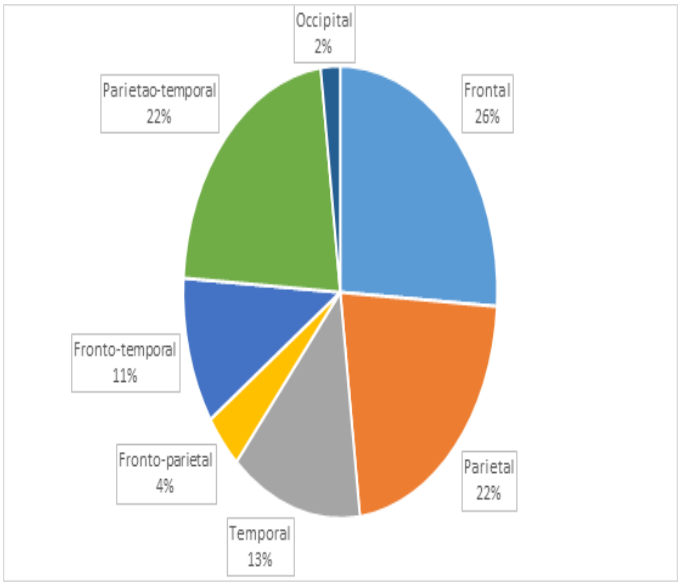

Figure 2: Location/Site distribution of hematoma

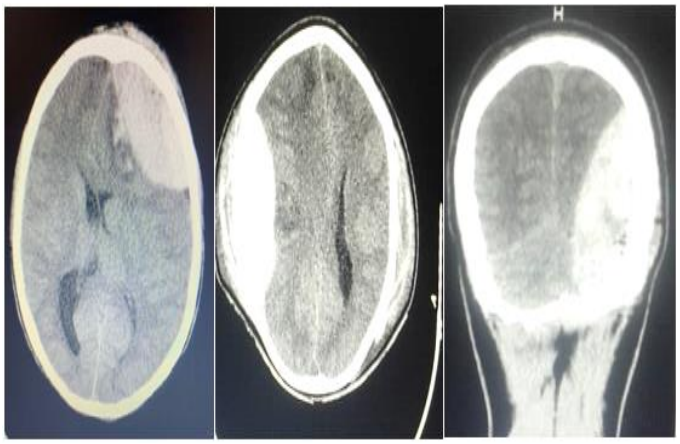

Figure 3: Representatives Pre-operative CT images showing Acute EDH

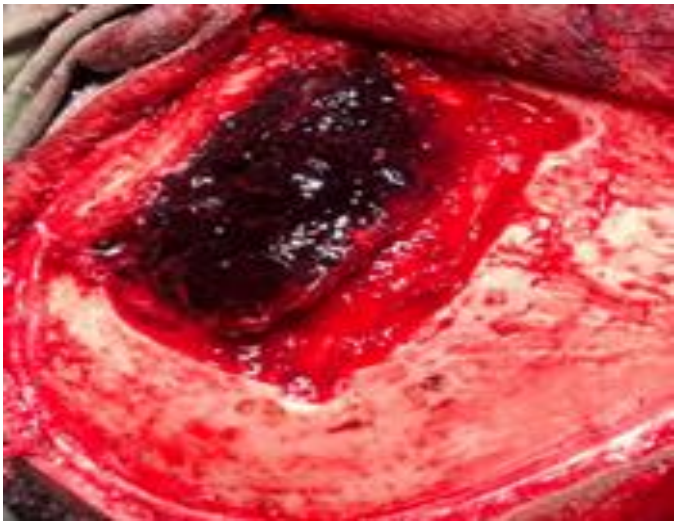

Figure 4: Intra-operative picture of Acute EDH

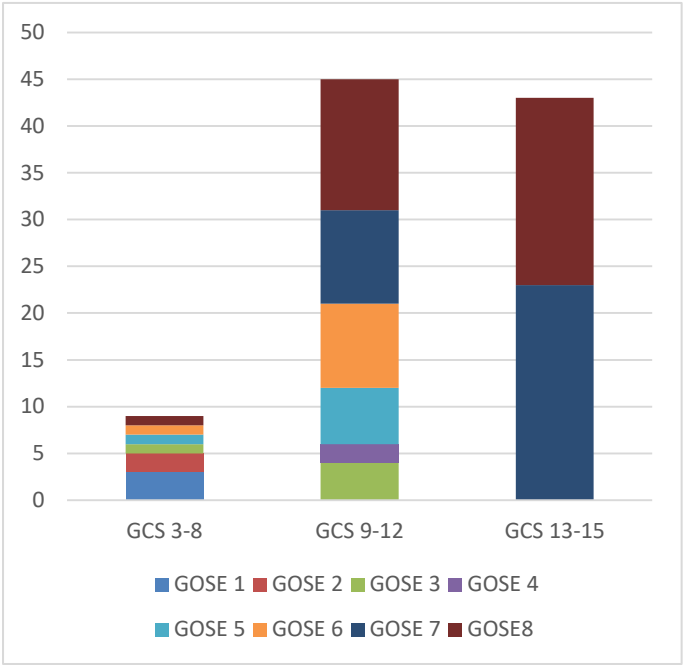

Figure 5: Relationship between severity and outcome

Discussion

This study provided us the opportunity to observe various aspect of EDH and to evaluate our management procedure. The incidence of EDH in our study is 3.3%. This incidence shows similarity with other studies from our country and outside our countries, where 1 – 3% has been reported (10, 11, 12). Although even within our country, a higher incidence of 8.4% has been reported (13) and this is also similar to higher incidence from Hong Kong (14). The highest number of EDH (31%) were seeing in the third decades of life (5, 8, 15). This proportion followed closely by 4th decade of life (28%). These age groups are generally accepted to be most active due to high physical activities and adventures. Male to female ration of 7.8:1 is a reflection of prevailing social culture where most of the women are housewives and are not exposed to external work or tasks and hazards like male population.

Road traffic accident and assault are the prominent etiological factors of acute EDH in our study accounted for 77%. This is similar to studies from our locality (13, 16). This findings shows that most of the causes of acute EDH are preventable or modifiable causes. Sixty percent of the patients presented after 48hrs of the injury and out this, 15% presented after the trauma. This time of presentation was at variance with Royal College of Surgeons of England guidelines which recommended that surgery be carried out within 4 hours (17). Time of presentation in this study was not optimal for favorable outcome but this is often due to poor road network and lack of neurosurgical care close to many rural communities, most are initially managed at different peripheral hospitals.

Location is highest in frontal followed by parietal region and parieto-temporal regions. This disposition are determined by mechanism of trauma and variable in each patient. Though parietal region was reported by Emejulu et al & Well's et al (16, 18). The classic lucid interval has been reported by some studies between 20-50% (19, 20). However, we recorded a 10% rate of lucid interval. 15.5% of our patients were unconscious before the surgical intervention which is at variance with some study where 12% to 42% has been reported conscious between the trauma and surgery (2, 8,).

The Glasgow coma score on admission has been adjudged to be a reliable predictors of outcome in EDH, the higher the GCS score, the better the outcome of EDH (12). This study recorded no death among patients who presented with GCS >9. However, only 33.3% of patients with presenting GCS 3-8 died and this is close to 30% reported for the same category of patients in Mezue et al study (13). The overall mortality rate of 3.1% in our study is relatively lower compared to previous studies where two-digit mortality rate has been reported (13, 16). The mortality rate in patients who were conscious during presentation was 0% and this is typically the same with Well's et al finding. 90% of our study patients had favorable outcomes. This recorded favorable outcomes can be explained by prompt surgical intervention in our facility, irrespective of time of interval between the trauma and presentation, all patients were operated within 48hrs of presentation.

Conclusion

Acute EDH is a known but serious complication of traumatic brain injury and it is a rewarding neurosurgical emergency. It is a potential fatal pathology that is treatable but with immediate or early diagnosis and surgical intervention. The favorable outcome was 90% despite the delayed presentation in most of the patients and most of them have Glasgow outcome score (extended) of 8, 7, 6 and 5. Improving social amenities and establishment of many neurosurgical services within 100km radius in the country will surely improve the outcome beyond our findings.

Source of fund: None

Conflict of interest: Authors declare no conflict of interest

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