

Original Research Article

Traumatic infratentorial epidural haematoma: presentation and treatment outcome at the Jos University Teaching Hospital, North Central Nigeria

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ABSTRACT

Background: Traumatic infratentorial epidural haematoma (TIEH), also called posterior fossa epidural haematomas when compared to their supratentorial counterparts, are very rare and their presentation nonspecific, accounting for 0.1-0.3% of all head trauma. Data on TIEH in our environment is very scanty. Our objective was to document the different presentations of TIEH and the outcome of management of these patients in our setting.

Methods: This was a retrospective study of consecutive patients with head injury in whom non contrast cranial CT scan showed the presence of an infratentorial epidural haematoma and who presented to the Jos university teaching hospital between January 2012 to December 2020. The patients' demographics, aetiology, clinical features, CT scan findings and outcome of treatment were extracted from the case folders and analysed using simple proportions.

Results: There was a total of seven patients with TIEH out of a total of 308 patients with traumatic epidural haematoma, thus accounting for 2.3% of epidural haematomas in our series. All the TIEH were caused by road traffic collisions, all but one (85.7%) occurred in adults. Six (85.7%) of the patients had occipital skull fractures detected with cranial CT scan or at surgery. Two (28.6%) of the patients were managed non-operatively under close monitoring and did well. Five (71.4%) of the patients were managed surgically. There was one death, giving an overall mortality of (14.3%).

Conclusions: TIEH is rare, the presentation is non-specific and early surgical decompression is lifesaving in selected patients.

Keywords: Trauma, Infratentorial, Epidural haematoma, CT scan, Venous sinuses

INTRODUCTION

TIEH is a rare clinical entity occurring as a complication in 0.1-0.3% of head injuries.^{1,2} The infratentorial compartment is a much smaller cavity when compared to the supratentorial compartment. The brainstem and the cerebellum share this small space. A space-occupying lesion in this compartment would therefore have profound effect on the structures, especially the sensitive brainstem. Major venous sinuses are found at the

boundaries of this space. Trauma to the occipital area can lead to fractures of the occipital bone and may tear these sinuses leading to the formation of haematomas in this space. This is thought to be the major mechanism by which TIEH forms.^{1,3} Bleeding could also arise from the diploe when there is fracture or rarely from arteries.¹ Again, because of the tight space, deterioration can be very rapid leaving very little chance for salvaging the patient.^{2,4} To add to this precarious situation, the symptoms are often non-specific, leading to delay in

diagnosis and thus treatment that could be offered to the patient.^{1,2,5} Though the symptoms may develop slowly, deterioration in the patients clinical state can be very rapid, often times giving very little chance of salvaging the patient.^{2,6,7} Based on the time taken for the development of symptoms, TIEH can be classified into acute (within 24 hours), subacute (2-7 days) and chronic (beyond 7 days).¹ A non-contrast cranial CT scan is the investigation of choice in TIEH as for most other cranial bleeds. It is able to detect the haematoma and other injuries like contusions, subdural haematomas, fractures and subarachnoid haemorrhage which could influence the outcome. Some indications for surgery include fourth ventricle, basal cistern, brainstem compression and deteriorating level of consciousness.⁸ Typically, the surgical decompression involves an occipital craniectomy or a craniotomy. Some authors have suggested the use of trephination or minicraniectomy as a treatment option in selected patients, especially children.⁹ Factors that may determine outcome of TIEH management include level of consciousness at the time of intervention, the clinical course of the disease, cranial injuries, failure to make a diagnosis, old age and volume of the haematoma.^{10,11}

The objective of this study was to determine the clinical presentation of patients with TIEH, the role of skull X-ray and CT scan in making diagnosis and to determine the outcomes of treatment.

METHODS

It is a retrospective study of consecutive patients of all ages, both males and females with TIEH diagnosed on cranial CT scan who presented at the Jos university teaching hospital between January 2012 and December 2020. Patients with incomplete records were excluded from the study. The case notes of the patients were retrieved and the parameters of interest which included the age, sex, aetiology, clinical presentation, the post resuscitation Glasgow coma score (GCS), the CT scan findings, the treatment offered and outcome of treatment using the Glasgow outcome score (GOS) were extracted and entered into statistical package for social sciences (SPSS) version 26 spreadsheet. Each patient's corresponding CT scan was assessed for the presence of a posterior fossa haematoma and factors favouring surgical intervention were determined. Those patients with deteriorating level of consciousness or who showed evidence of compression of the fourth ventricle or basal cisterns were considered candidates for surgical intervention. The data obtained was analysed using SPSS version 26. The age was summarized as median and interquartile range. The demographics, Glasgow coma score, key clinical features, CT scan findings, types of interventions and the outcome are summarized in a tabular form (Table 1).

Table 1: Summary of findings in the patients.

S. no.	Age (in years)	Sex	Aetiology	GCS ^a	Other clinical features	CT scan findings	Type of intervention	Outcome
1	25	Male	RTA	15	Initial loss of consciousness, vomiting	Right small TIEH ^b ; occipital skull fracture	Non operative	Good recovery
2	18	Male	RTA	8	Loss of consciousness	Left temporo-occipital skull fracture, left TIEH ^b .	Craniotomy	Good recovery
3	35	Male	RTA	7	CSF rhinorrhoea, unconsciousness	Left TIEH+supratentorial EDH	Craniotomy	Died
4	6	Male	RTA	12	Initial loss of consciousness, headache	Right TIEH, supratentorial intracerebral contusions	Craniectomy	Good recovery
5	27	Male	RTA	14	Headache, blurring of vision	Left TIEH	Non operative	Good recovery
6	61	Male	RTA	15	Headache, vomiting	Right TIEH, frontal contusions	Craniotomy	Good recovery
7	63	Female	RTA	13	Dizziness	Left TIEH+left occipital EDH ^c	Craniotomy	Good recovery

a=Glasgow coma score, c=extradural haematoma, b=traumatic intratentorial haematoma.

RESULTS

Out of a total of 308 patients with extradural haematoma, 7 patients had TIEH thus accounting for 2.3% all our patients with epidural haematomas within this period. All the patients were males. The median age of the patients was 27 years (IQR 43). All the trauma was caused by motor vehicular collisions. Six (85.7%) of the patients had altered level of consciousness at some point following the trauma. Six (85.7%) of the patients had occipital skull fractures detected with cranial CT scan or at surgery. Two (28.6%) of the patients were managed non-operatively under close monitoring and did well. Five (71.4%) of the patients were managed surgically. There was one death, giving an overall mortality of 14.3%.

A summary of the findings is shown in Table 1. Computerised tomographic scans of some of the patients are also shown in Figures 1-5.

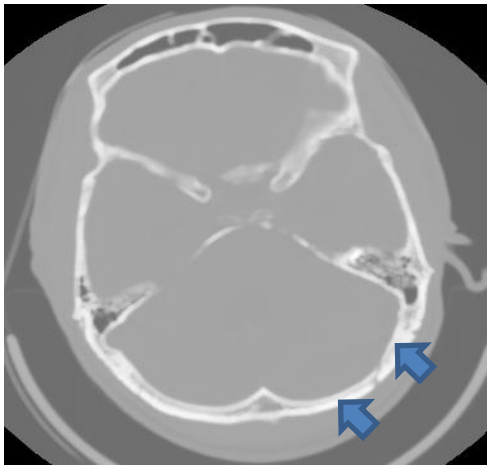


Figure 1: CT scan bone window showing a left occipital fracture seen between 2 blue arrows.

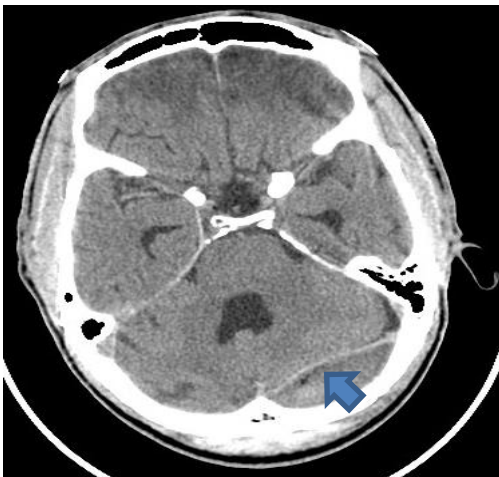


Figure 2: CT brain of same patient in Figure 1 showing a left chronic infratentorial epidural haematoma (arrow).

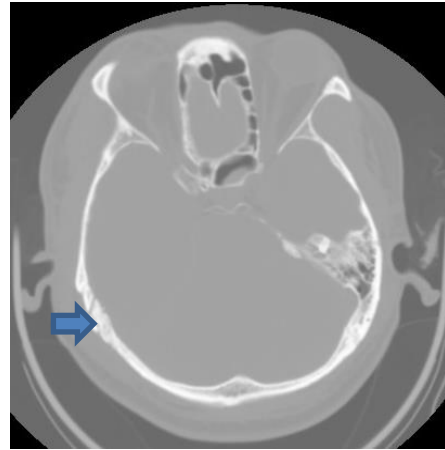


Figure 3: CT scan bone window showing fracture line in the right mastoid area.



Figure 4: CT brain of same patient in Figure 3 showing a small epidural haematoma (arrow), obliteration of the 4th ventricle and the cisterns.

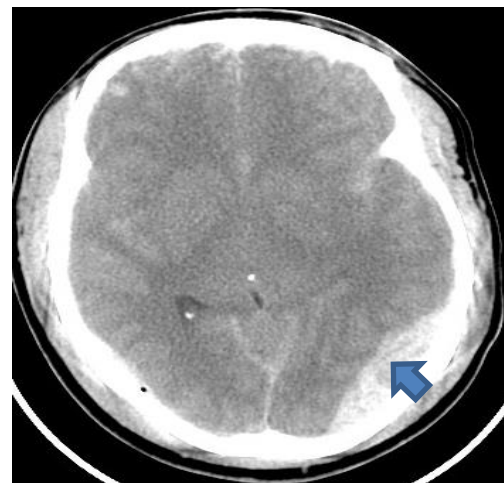


Figure 5: CT brain of same patient in Figure 3 showing an associated supratentorial epidural haematoma on same side, severe brain swelling, SAH and multiple frontal contusions.

DISCUSSION

TIEH is seen more commonly in the 20-47 years age group.^{1,3,6} Most of our patients fall within this age group (four out of seven). All but one of our patients were males. The young males are very active and adventurous and are therefore more likely to be involved in cases of trauma. Road traffic collision was the aetiology in all our patients. This compares with most series in literature.¹⁻⁷ A study done in South East Europe noted the presence of soft tissue swelling in the occipital and retromastoid areas in all their patients and the authors opined that these are major indicators to the possible presence of an infratentorial epidural haematoma.¹ In our series, these findings were not documented and thus cannot be commented upon. Two of our patients had a lucid interval. Mahajan et al reported a lucid interval of 42.1% in a series of 19 patients.¹² The lucid interval, though a classic feature of extradural haematomas, occurs in only about one third of cases. The lucid interval is also known to occur in cases of acute subdural haematomas. The lucid interval may indicate the presence of an expanding haematoma. Five of our patients had fractures involving the occipital and the mastoid bones on cranial CT scan. Koc et al reported a rate of 40-86% of fractures of the occipital bone or diastasis of the lambdoid suture.¹³ The presence of an occipital or mastoid fracture which can easily be picked on a skull X-ray is an important pointer to a possible underlying haematoma in the posterior fossa or at least that a risk exists for the possible development of such a haematoma. This is very important especially where CT scan is not readily available to clinch the diagnosis. Unlike supratentorial haematomas, TIEH are without characteristic symptoms.¹ In our series, headache was the most common symptom. Other symptoms in our patients included altered level of consciousness. One of our patients presented with a GCS of 7/15 with dilated, fixed pupils. Within few minutes of presentation, whilst being prepared for surgery, the GCS dropped to 3T/15. Though this same patient presented early (within 3 hours) and had prompt surgical intervention within an hour of presentation, this was not enough to salvage him. He died 27 hours after the surgical decompression. This underscores the point that deterioration could be rapid, hence the importance of early diagnosis and prompt surgical intervention in those that meet the recommendations for surgical decompression. In three of our patients, the haematomas were mixed, there were infratentorial and supratentorial portions. Other intracranial lesions that may be associated with TIEH include contusions, subdural haematoma and subarachnoid haemorrhage and this association may be as high as 87.5%.¹

Sometimes the decision between managing a patient conservatively or surgically is not clear. Born-Seng et al in his series of 43 patients had 40 patients managed surgically while the remaining three were managed non-operatively.³ Those managed non-operatively were those without mass effect on their CT scans. These same

patients were monitored closely with serial CT scanning.³ In our series, two patients were managed non-operatively. They were both fully conscious but had mild to moderate headache. Their brain CT scans showed some mass effect. One was managed in the high dependency unit with close monitoring of vital signs and neurology of the patient. The other declined admission and surgical intervention. Both were seen at the outpatient department after discharge with resolution of their symptoms. In the supratentorial compartment, a level 3 recommendation/indications for surgical evacuation of an epidural haematoma include a volume of 30 ml, widest diameter of 10 mm or more and a midline shift of 5 mm or more. In TIEH, the indications for surgical evacuation are vague, but level 3 evidence provides the following guidelines: symptomatic mass lesion or those with mass effect on CT scan. These mass effects include dislocation, compression or obliteration of the 4th ventricle; compression or loss of basal cisterns or the presence of obstructive hydrocephalus. The same authors recommended that such haematomas meeting the above criteria should be evacuated as soon as possible and recommended a sub-occipital craniectomy as the procedure of choice.¹⁴ All our patients were symptomatic and going by the recommendations should all have had surgery. Two of the patients had obliteration/compression of the 4th ventricle. One of the patients was deliberately managed non-operatively. He was fully conscious at presentation but was complaining of generalised headache. He had had a single episode of non-projectile vomiting. He was managed non-operatively at our high dependency unit with close monitoring of his vital signs and neurology. He remained stable and was discharged after a week. He was seen at the outpatient clinic two weeks after discharge and was asymptomatic. The second patient who was also complaining of headache presented two weeks after trauma to the head. He was offered surgery but he declined. He was discharged and was seen once at the outpatient clinic without symptoms. Though a request for a repeat CT scan was made for both patients, they were yet to do on financial ground. Four patients had early surgery. Our surgical approach was an occipital craniotomy except for the 6 years old child who had an occipital craniectomy. Only in one patient was on-going bleeding seen at surgery. This bleeding was coming from a torn transverse sinus and this was repaired using vicryl 4/0 and surgical applied at site of repair. We had one mortality. This was a 35 year old man who presented 4 hours after a road traffic collision with loss of consciousness. He had a GCS of 7/15 (E-1, V-1, M-5). His pupils were 6 mm bilaterally dilated and unreactive. His respiratory rate was 26 per min, BP=170/100 mmHg. The cranial CT scan revealed a left temporo-parieto-occipital extradural haematoma with both supratentorial and infratentorial components. Whilst the patient was being prepared for surgery, within 30 min of presentation, his GCS suddenly dropped to 3T/15. He had emergency craniotomy and evacuation of about 70 ml of clotted blood from both compartments. He was managed in the ICU post operatively. There was an initial improvement

in the patient's GCS to 6T/15 in the immediate post-operative period, but he subsequently deteriorated further and died 27 hours after the surgical decompression. This patient already had severe brainstem compromise at the time of presentation and though he had an almost immediate surgical decompression, our intervention was rather too late to salvage the patient. This scenario underscores the importance of early diagnosis and surgical intervention in patients who meet the indications for surgical intervention. As manifested in this patient, the deterioration can be very rapid leaving very little room for intervention.¹⁵⁻¹⁹

Some of the limitations in this study included the few number of patients and inability to obtain post-operative CT scans. The long-term outcome of those operated and those managed non-operatively would need to be monitored subsequently.

CONCLUSION

Traumatic infratentorial epidural haematomas though rare, present with nonspecific symptoms that require a high index of suspicion to clinch the diagnosis and prevent catastrophe that accompany delayed interventions. This study has demonstrated the sudden deterioration that occur in this condition that could give rise to a fatal outcome.

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