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Clinical profile of traumatic Extradural Dural Hematoma

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Abstract
Introduction: Traumatic brain injury occurs when an external mechanical force causes brain dysfunction. Extradural hematoma (EDH) is a collection of blood in the potential space between the dura and the bone. Traumatic EDH is treatable Neurosurgical Emergency with good rewards.
Material & Methods: We studied 50 head injury patients admitted in general surgery wards of Tertiary care teaching hospital over a period of 2 years. All these patients were diagnosed to have Extradural Hematoma (EDH) with surgery as the primary line of management.
The study design was prospective non randomized trial.
Observation: Commonest age group involved was 21 to 30 yrs 82.0% were male (n = 41) while 18.0% were female (n = 9).
Commonest mode of injury was road traffic accident (RTA) (n= 28, 56.0).In this study of 50 patients of traumatic EDH, we found that tempero-parietal site was involved in 34.0% (n = 17) of the patients
In our study of 50 patients of traumatic extradural hematoma, 64.0% (n = 32) of the patients were operated within 12 hrs of incident/accident. While 10.0% (n = 5) of the patients were operated after 24 hrs. Traumatic extradural hematoma who underwent surgery for the same, 12.0% (n = 6) of the patients died while 88.0% (n = 44) of the patients were discharged from the hospital.
Conclusion: Traumatic extradural hematoma is a well-recognized and most rewarding neurosurgical emergency. It must be recognized and evacuated early to prevent potential mortality and morbidity.

Keywords: Extradural hematoma, Traumatic, Glasgow coma scale.

Introduction

Traumatic brain injury is defined as damage to the brain resulting from external mechanical force, such as rapid acceleration or deceleration [1].

Traumatic brain injury can be classified by its pathological features [2]. Lesions can be extra-axial, (occurring within the skull but outside of the brain) or intra-axial (occurring within the brain tissue) [3].

Intracranial hematomas are collections of blood in or around the brain that can result from hemorrhage [4]. Intra-cerebral hemorrhage, with bleeding in the brain tissue itself, is an intra-axial lesion. Intracranial hematomas include epidural hematoma, subdural hematoma, subarachnoid hemorrhage, and intra-ventricular hemorrhage [5].

Extradural hematoma (EDH) is a collection of blood in the potential space between the dura and the bone. Usually people with moderate to severe TBI will have several CT scans during the course of a hospital stay to keep track of any lesions that have been noted. In some cases, a magnetic resonance imaging (MRI) scan may also be performed. People with EDH hematoma are expected to have a good outcome if they receive surgery quickly [6]. The 4 features that predict outcome In patients who underwent surgery are Associated brain injury, Best motor response, volume of the haematoma, length of stay in hospital [7].

We studied Clinical profile of Traumatic Extra dural hematoma Cases.

Aims & Objectives

To study clinical profile of Traumatic Extra Dural Hematoma & determine outcomes of traumatic Extra-dural hematoma based on age, sex, cause of injury, pre-op GCS score, clinical presentation, pupil size and reactivity, associated lesions, site of hematoma, time interval between incident/accident and operation, clinical outcome in terms of mortality. To determine the parameters that must be considered in analyzing patient's prognosis. Such as time interval between incident/accident and operation. Also to determine whether traumatic Extra-dural hematoma is a neurosurgical emergency and to prove whether timely surgical intervention for significant Extra-dural hematoma is a gold standard.

Material & Methods

This study includes 50 head injury patients admitted in general surgery wards of Tertiary care Teaching hospital. All these

patients were diagnosed to have Extradural Hematoma (EDH) on CT brain with surgery as the primary line of management.
The study is prospective non randomized trial.
Detailed clinical history of each patient was taken. This was followed by blood tests, chest X ray, X ray abdomen, USG abomen & pelvis, CT scan of brain.
Post op, patients were evaluated everyday till they were discharged from the hospital or death occurred.
All the collected data was tabulated and master chart was prepared. Data was analyzed by using SPSS (Statistical package for social sciences) version 19.0 We have used Fisher's exact test to find out the significant correlation between clinical outcome in terms of mortality and pre-op GCS, pupillary reaction, associated lesions, time interval between incident/accident & operation, age group in years.

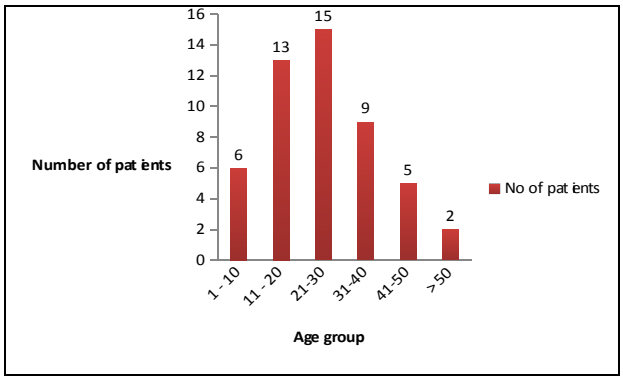
Observation and Result

1. Distribution of patients with respect to age (years).

Table 1

Age groups	No of patients	Percentage (%)
1-10	6	12.0
11-20	13	26.0
21-30	15	30.0
31-40	9	18.0
41-50	5	10.0
> 50	2	4.0
Total	50	100.0

This table explains the distribution of patients with respect to age in years. Age of the patients were ranged from 3 yrs to 77 yrs. Commonest age group involved was 21 to 30 yrs (n = 15, 30.0%) followed by 11 to 20 yrs (n= 13, 26.0%).

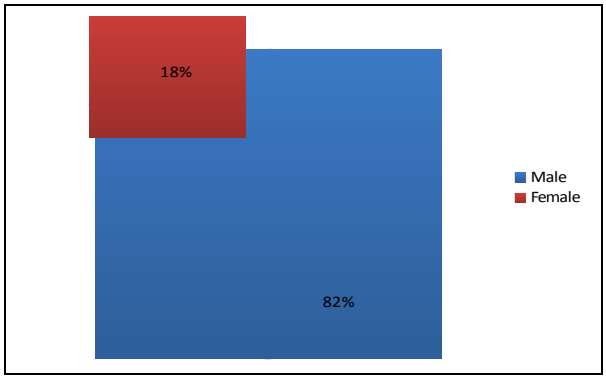


2. Distribution of patients with respect to sex.

Table 2

Sex	No of patients	Percentage (%)
Male	41	82.0
Female	9	18.0
Total	50	100.0

This table explains the distribution of patients with respect to sex. Of these 82.0% were male (n = 41) while 18.0% were female (n = 9). Male to female ratio was 4.56
Figure 2 -

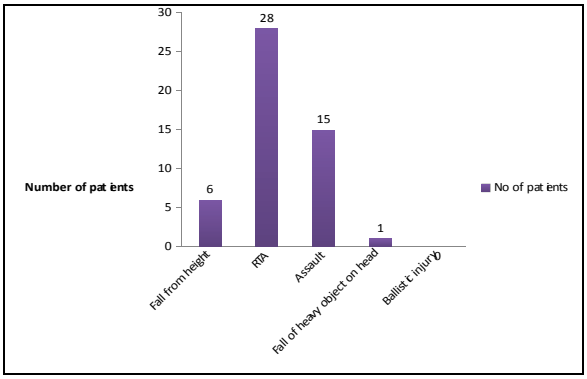


3. Distribution of patients with respect to Mode of injury.

Table 3

Cause of injury	No of patients	Percentage (%)
Fall from height	6	12.0
RTA	28	56.0
Assault	15	30.0
Fall of heavy object on head	1	2.0
Ballistic injury	0	0.0
Total	50	100.0

This table explains the distribution of patients with respect to mode of injury. In our study we found that commonest mode of injury was road traffic accident (RTA) (n= 28, 56.0%) followed by assault (n= 15, 30.0%).
Figure 3–



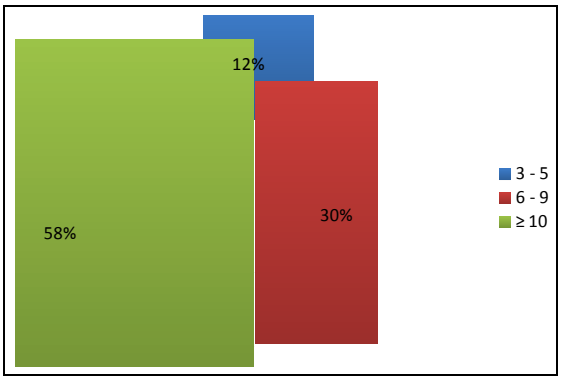
4. Distribution of patients with respect to GCS score

Table 4

GCS score	No of patients	Percentage (%)
3-5	7	14.0
6-9	14	28.0
≥ 10	29	58.0
Total	50	100.0

This table explains the distribution of patients with respect to pre-op GCS score. In our study we found that 14.0% of patients belong to GCS score of 3-5, 28.0% of patients belong to GCS score of 6-9 while 58.0% patients belong to GCS score of ≥ 10.
In our study only those patients requiring surgery as the primary line of treatment are included. Patients with a poor GCS score of 3/15, pupils fixed and dilated are usually not operated due to poor prognosis & hence excluded from our

study. As a result GCS score group of 3-5 has decreased in our study. Hence no conclusion can be made.
Figure 4 –

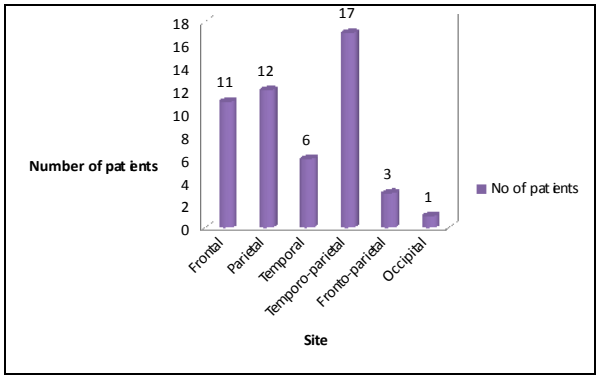


5. Distribution of patients with respect to site of hematoma

Table 5

Site of hematoma	No of patients	Percentage (%)
Frontal	11	22.0
Parietal	12	24.0
Temporal	6	12.0
Temporo-parietal	17	34.0
Fronto-parietal	3	6.0
Occipital	1	2.0
Total	50	100.0

In this study of 50 patients of traumatic EDH, we found that temporo-parietal site was involved in 34.0% (n = 17) of the patients followed by parietal region which was involved in 24.0% (n = 12) of the patients. While hematoma in frontal region was found in 22.0% (n = 22) of the patients. Only 1 patient had hematoma in occipital region.
Figure – 5

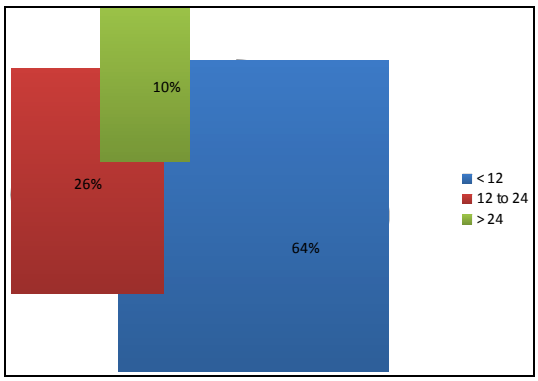


6. Distribution of patients with respect to time interval between incident & operation

Table 6

Time interval in hrs	No of patients	Percentage (%)
< 12	32	64.0
12 to 24	13	26.0
> 24	5	10.0
Total	50	100.0

In our study of 50 patients of traumatic extradural hematoma, 64.0% (n = 32) of the patients were operated within 12 hrs of incident/accident. While 10.0% (n = 5) of the patients were operated after 24 hrs due to their delayed presentation to our hospital. Figure 6

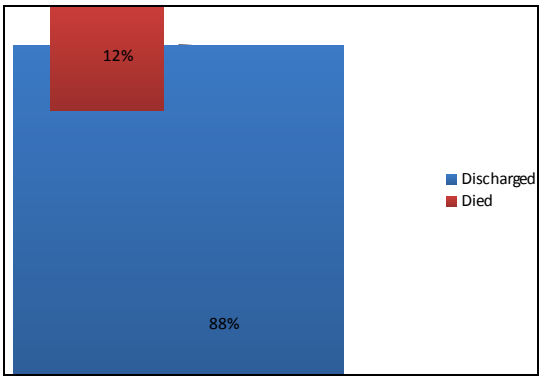


7. Distribution of the patients with respect to clinical outcome

Table 7

Clinical outcome	No of patients	Percentage (%)
Discharged	44	88.0
Died	6	12.0
Total	50	100.0

Table 7 explains the mortality rate in patients of traumatic extradural hematoma. In our study of 50 patients of traumatic extradural hematoma who underwent surgery for the same, 12.0% (n = 6) of the patients died while 88.0% (n = 44) of the patients were discharged from the hospital.
Conclusion – With the advances in anaethetics and neuro-surgical techniques, the mortality from Extra-dural hematoma is declining.
Figure 7

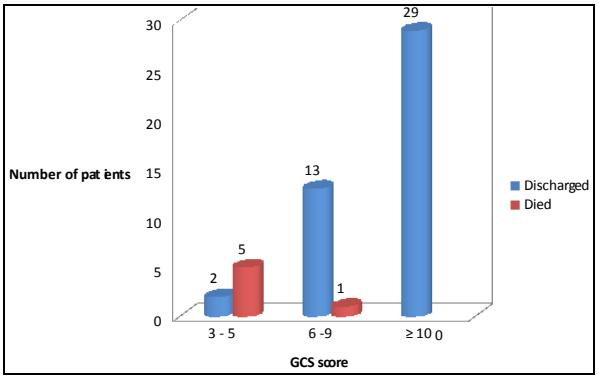


8. Distribution of patients with respect to GCS score and clinical outcome.

Table 8

GCS score	Clinical outcome		Total	p- value
	Discharged	Died		
3-5	2	5	7	< 0.001
6-9	13	1	14	
≥ 10	29	0	29	

Conclusion – By using Fisher's exact test p-value is < 0.05 therefore there is significant association between GCS score and clinical outcome in terms of mortality. More the GCS score better is the prognosis.
Figure- 8

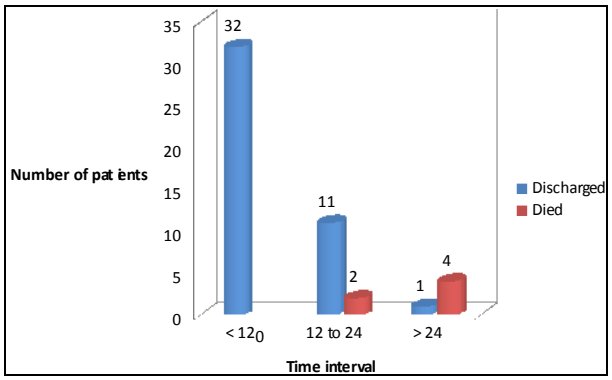


9. Distribution of patients with respect to time interval between incident / accident & operation and clinical outcome.

Table 9

GCS score	Clinical outcome		Total	p- value
	Discharged	Died		
< 12	32	0	32	< 0.001
12 to 24	11	2	13	
> 24	1	4	5	

Conclusion – By using Fisher's exact test p-value is < 0.05 therefore there is significant association between time interval between incident/accident & operation and clinical outcome in terms of mortality. More the time interval poor is the prognosis.
Figure 9

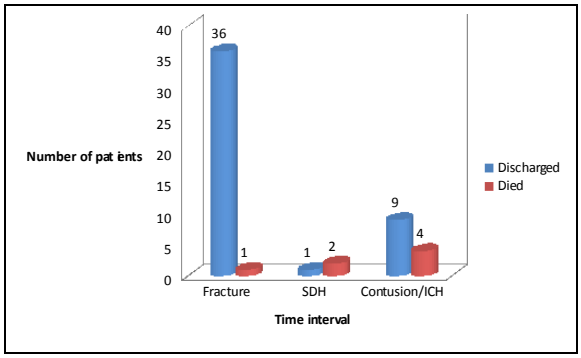


10. Distribution of patients with respect to associated lesion and clinical outco

Table 10

GCS score	Clinical outcome		Total	p- value
	Discharged	Died		
Fracture	36	1	37	0.003
SDH	1	2	3	0.035
Contusion/ICH	9	4	13	0.033

Conclusion – By using Fisher's exact test, p value is < 0.05 therefore there is significant association between associated lesions and clinical outcome in terms of mortality. The prognosis for patients with SDH, contusion/ICH is poor. While significantly more patients survived who had fracture.
Figure 10

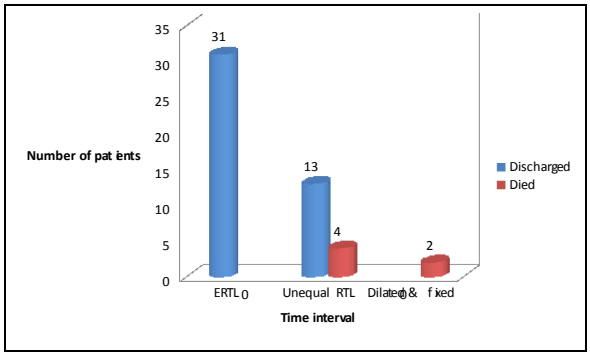


11. Distribution of patients with respect to pupillary findings and clinical outcome.

Table 11

Pupillary findings	Clinical outcome		Total	p- value
	Discharged	Died		
ERTL	31	0	31	< 0.001
Unequal RTL	13	4	17	
Dilated & fixed	0	2	2	

Conclusion – By using Fisher's exact test p-value is < 0.05 therefore there is significant association between pupillary findings and clinical outcome in terms of mortality. Patients with dilated & fixed pupils or pupils unequally reacting to light had poor prognosis.
Figure 11

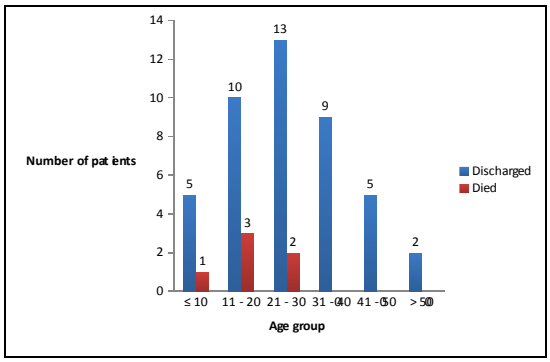


12. Distribution of patients with respect to age and clinical outcome.

Table 12

Age group	Clinical outcome		Total	p- value
	Discharged	Died		
1-10	5	1	6	0.656
11 - 20	10	3	13	
21 - 30	13	2	15	
31 - 40	9	0	9	
41 - 50	5	0	5	
> 50	2	0	2	
Total	44	6	50	

Conclusion – By using Fisher's exact test p value is > 0.05 therefore there is no significant association between age (years) and clinical outcome in terms of mortality.
Figure 12



Discussion

This prospective study include only surgically managed cases of Traumatic EDH. Since the introduction of CT scan as the imaging study of choice to detect intracranial lesion after trauma [8], it is now possible to detect not only EDH but also identification of additional features that effects the outcome 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 [9].

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. In this study, patients' age ranged from 3 yrs to 77 yrs. Highest number of victims were in the most active period of life i.e. third decade (n = 15, 30.0%) closely followed by second decade (n = 13, 26.0%). Only 2 patients (4.0%) were above the age of 50 yrs. According to various case series studied so far, peak age of traumatic EDH is in second decade and mean age of patients with EDH is between 20 to 30 yrs [10, 11, 12, 13, 14, 15]

In our study we found that most of the victims were male (n = 41, 82%). The male dominance among the victims of EDH is recognized with only 7 - 26 % of cases in different series being female [13, 16, 17].

In our study we found that road traffic accident (RTA) (n = 28, 56.0%) was the most common case of traumatic EDH followed by assault (n = 15, 30.0%) which is comparable with many other published series [14, 18, 19] but is contrast to Baykenar *et al* [20], Ersahin *et al* [21].

According to a study done by Uzkan U, Kemaloglu S *et al* [18], Kuday C, Uzan M *et al* [19] and Lee EJ, Hung YC *et al* [14], road traffic accident was the most common cause of injury in traumatic EDH.

In our study we found that the classically described 'lucid interval' was found in 24.0% (n = 12) of the patients which is similar to Babu *et al* who observed it in only 20.0% of the cases [22]. In our study we divided pupillary reaction into three groups. In 62.0% of the patients (n = 31) pupils were equally reacting to light. 34.0% of the patients (n = 17) had pupils unequally reacting to light while only 2 patients had pupils dilated and fixed.

According to a study by Bullock MR, Chesnut R *et al* [8] pupillary abnormalities were observed in 18.0-44.0% of the patients. We observed it in 38.0% of the patients.

According to the various reported series so far, EDH is more frequently located in the temporo-parietal and temporal region as compared with other location [8] [18]. According to our finding, location of EDH is highest in tempero-parietal region followed by parietal region which is closely followed by frontal region. These results are comparable with the study done by Uzkan U, Kemaloglu S *et al* [18] and Bullock MR, Chesnut R *et al* [8].

However according to our study, EDH in temporal fossa was found in only 12.0% of the cases which is in contrast to the study done by Kaye AH *et al* [23] who observed EDH located in temporal region in 66.0% of the cases. In our study we found that all the 6 patients who died, EDH was located in parietal region although high mortality has been reported in association with EDH in the temporal region [10, 21].

Associated intracranial lesions are found in between 30 and 50.5% of adults with surgically evacuated EDH [8] [10] [14] [15].

All the patients in our study were operated on emergency basis. In our study we found that 32 patients (64.0%) were operated in less than 12 hrs of the time from incident/accident. While 5 patients (10.0%) were operated after 24 hrs of the incident/accident. This delay in time interval was due to patient's delayed presentation to our casualty.

We divided duration of time interval between incident/accident and operation into 3 groups. Of the 50 patients, 32 were operated within 12 hrs of accident/incident. Of these 32 patients none of the patients died. 13 patients were operated within 12-24 hrs of incident/accident. Of these 13 patients 11 survived while 2 patients died. Time interval between incident/accident and operation was > 24 hrs for 5 patients. Of these 5 patients only 1 patient survived.

In patients who underwent surgery for the same, the mortality rate was 12.0% (n = 6).

All patients were operated by us on emergency basis. The delay in time interval was due to patients' delayed presentation to our hospital.

By using Fisher's exact test, there was significant association between time interval between incident/accident & operation and clinical outcome in terms of mortality. Early surgical intervention is associated with good prognosis.

Summary

Traumatic head injury is more common in younger age group. Road traffic accident is most common cause of traumatic extra-dural hematoma followed by assault. Most common site for traumatic Extra-dural hematoma is temporo-parietal region.

Most of the cases of extra-dural hematoma are associated with skull fracture and most of the hematomas are present at or near fracture site.

There was significant association between time interval between incident/accident & operation and clinical outcome in terms of mortality. More the time interval poor is the prognosis.

With the advances in anaesthetics and neuro-surgical techniques, the mortality from extradural hematoma is declining.

Conclusion

Thus we conclude that traumatic extradural hematoma is a well-recognized and most rewarding neurosurgical emergency. It must be recognized and evacuated early to

prevent potential mortality and morbidity. We also conclude that time interval between incident/accident and operation) is independent predictor of prognosis in patients with traumatic extradural hemtoma.

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