

## A STUDY ON INCIDENCE, ETIOLOGY, CLINICAL PRESENTATION AND LOCATION OF CONSERVATIVELY MANAGED EXTRA DURAL HEMATOMA

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### ABSTRACT

**Objectives:** To study the incidence, etiology, clinical presentation and location of conservatively managed extra dural hematomas (EDHs).

**Methods:** A total of 23 EDH cases requiring conservative management were included in the study. All the patients were subjected to complete neurological examination including and various imaging techniques like computed tomography brain and chest X-ray. The patients with hematoma volume <30 ml, thickness <5 mm, midline shift <5 mm, Glasgow Coma Scale >8, were subjected to conservative management by admitting the patients in intensive care units.

**Results:** Among 23 EDH cases, 17 (74%) cases were males and 6 (26%) cases were females. A total of 8 patients were with age group of 10–20 years, 7 patients were with age group of 21–30 years and 8 patients were with age group of 31–40 years. The mean age of patients was 26.7 years. Road traffic accident was the common mode of injury in 47.8% (11 cases) of patients. The majority of the patients (34.7%) presented with frontal EDH.

**Conclusion:** EDH with low volume can be considered for conservative therapy by close observation, yet a risk of sudden neurological deterioration. However, surgical evacuation is the definitive treatment of EDH but craniotomy can be avoided in many patients with keen observation and repeated neurological assessments.

**Keywords:** Extra dural hematoma, Conservative management, Frontal extra dural hematoma.

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### INTRODUCTION

Head injury has become a major cause of death and disability in young population these days.

The incidence and mortality rate of Traumatic Brain Injuries (TBIs) is 20/100,000 per year at the global level. There is inconsiderable epidemiological information of TBIs in India due to lack of systematic research efforts. The only epidemiological study undertaken in Bangalore by the authors has revealed that the incidence, mortality and case fatality rates were 150/100,000, 20/100,000 and 10%, respectively. Various factors are responsible for increase in incidents of head injuries such as alcohol and drug intoxication, raise in crime rates and violence, ignoring safety and traffic rules on road, increasing import of technology without safety criteria [1].

Extra Dural hematoma (EDH) is major complication of traumatic brain injury and it is seen in 2.5% to 5% of head injured patients. There are three layers which covers and protect the brain and the outer layer which is located near to skull is called the dura. The extradural space is a space between the dura and the skull. Injury of the blood vessel located in the space leads to formation of haematoma. So, EDH is a blood clot that develops between the dura mater and the skull, it usually has a biconvex shape [2,3].

The temporal bone fracture leading to the rupture of the middle meningeal artery or vein is a major bleeding source for extra dural haematoma formation. And the formed haematoma may grow rapidly compressing the underlying brain parenchyma [4]. Extradural hematoma is a neurosurgical emergency which requires immediate accurate diagnosis and evacuation to reduce morbidity and mortality. The management of EDH is greatly influenced by the neurological status of the patients as well as the volume of haematoma [5].

According to recent guidelines, the patients with Acute EDH, Glasgow Coma Scale (GCS) less than 9 with pupillary abnormalities like anisocoria and Hematoma volume >30 ml regardless of GCS have to be managed with surgical intervention [6]. However several reports says that if the volume of EDH is ranging from 10 to 55 ml, they can be managed with conservatively without any surgery [5]. The present study was executed with aim of evaluation of the incidence, etiology, clinical presentation and location of conservatively managed EDHs.

### METHODS

This is a prospective interventional study, conducted in Department of Neurosurgery at Madras Medical College, Madras. The present study was conducted over a period of 1 year, after getting approval from Institutional Ethics Committee. A total of 23 cases of EDH were included in the study.

#### Inclusion criteria

EDH cases requiring conservative management were included in the study. The conservative management was considered in patients with EDH volume <30 ml, thickness <5 mm, midline shift <5 mm, GCS >8, and if there are no other surgical lesion on computed tomography (CT) scan.

#### Exclusion criteria

The EDH cases who required surgical management. Patients with bleeding tendency or inappropriate bleeding profile.

#### Conservative management

The complete history of head injury as well as demographic details were collected. All the patients were subjected to complete neurological examination including GCS and various investigations were carried out including imaging techniques like CT brain and chest X-ray. The patients with volume <30 ml, thickness <5 mm, midline shift <5 mm, GCS >8, and if there are no other surgical lesion on CT scan were subjected to

conservative management by admitting the patients in intensive care units (ICU). The admitted patients were managed with Pharmacological therapy. Analgesics were given to manage the pain, Antibiotics were given to prevent and treat the infection and Antiepileptic drugs were added if required. The follow up CT Brain was done at 6 h, 12 h, 24 h and 48 h after admission. After 3 days at ICU, if the patient had gained good conscious level then, he was transferred to Neurosurgery ward. The CT brain was repeated before the patient is discharged from the hospital, to ensure the resolution of EDH. The patients were asked to come for follow up after 1 month and immediately if needed.

**Statistical analysis**

The data was recorded in specially designed performa and descriptive statistics were applied.

**RESULTS**

A total of 23 cases with EDH who required conservative therapy were studied in the present study. Among 23 EDH cases, 17 (74%) cases were males and 6(26%) cases were females. Hence, male predominance was observed in the present study (Fig. 1).

A total of 8 patients were with age group of 10–20 years, 7 patients were with age group of 21–30 years and 8 patients were with age group of 31–40 years. The mean age of patients was 26.7 years. The mean age of male patients was 27.8 years and the mean age of female patients was 28.1 years (Fig. 2).

In the current study, 47.8% (11 cases) of patients had come with EDH due to Road traffic accident which can be considered as most common reason for head injury or EDH. Blunt trauma head due to assault was one of the mode of injury, encountered in 17.3% of EDH patients. In addition, fall from height (13%) and alcohol intoxication (21.7%) were the other mode of injuries leading to EDH (Table 1).

The patients with EDH presented with various signs and symptoms of head injury like nausea and vomiting which was seen in majority of the patients (91.3%). They also presented with other symptoms like headache and enlarged pupil (82.6%), hemiparesis (39.1%). Few patients had brought up with loss of consciousness (65.2%) and convulsions (17.3%). Confusion and slurred of speech was seen in 34.7% of patients (Fig. 3).

Approximately 65.2% of the patients presented with moderate GCS score (9–12 score) and 34.7% of the patients presented with mild GCS score (13–15 score) (Table 2).

In the current study it is observed that, the most common location of EDH was frontal area, specifically on left frontal area. Followed by Temporal hematoma (4 cases), Parietal hematoma (4 cases), Parietal occipital hematoma (3 cases) and posterior fossa hematoma (3 cases) were also encountered (Table 3).

**DISCUSSION**

The clinical examination including GCS score, pupillary anomalies and imaging techniques like CT scan to decide the volume of hematoma, thickness and mass effect plays vital role in deciding the specific management of EDH [7].

Craniotomy and evacuation is the most widely preferred treatment option for the management of acute extradural hematoma [8].

Conservative treatment should be considered only in well-established superspeciality hospital where the patient can be taken for emergency surgical evacuation, if required.

In a study carried out by Vaid *et al*, EDH was more common (76.67%) among males than females (23.33%) and 50% of the patients were in the age group of 21–41 years [9].

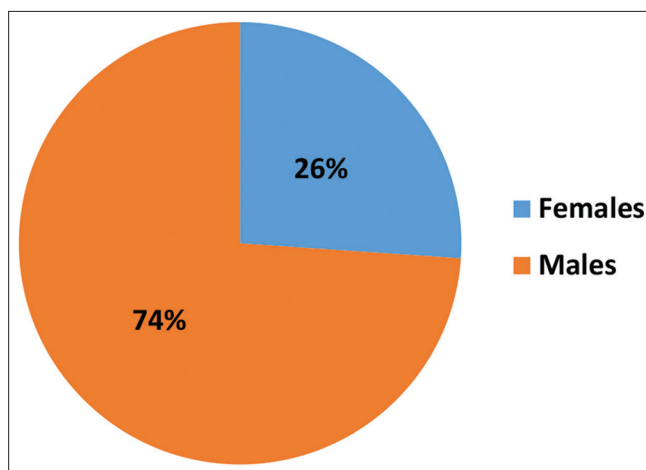


Fig. 1: Gender distribution

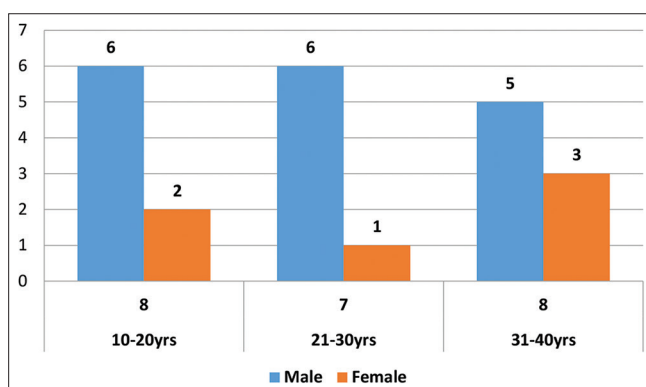


Fig. 2: Gender wise age distribution

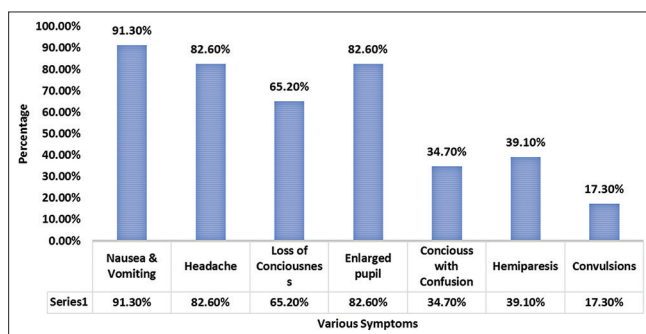


Fig. 3: Signs and symptoms

Table 1: Mode of injuries causing extra dural hematoma

Mode of head injury	Frequency (%)
Road traffic accidents	11 (47.8)
Blunt trauma head/assault	4 (17.3)
Fall from height	3 (13)
Alcohol intoxication	5 (21.7)

Similar findings were observed in the present study with 73.9 % of male patients, majority of them belonging to 10–20 years and 30–40 years of age group.

In the current study, the most common mode of injury was Road traffic accident (47.8%), followed by alcohol intoxication (21.7%), blunt trauma head due to assault (17.3%) and fall from height (13%). In a

similar kind of study conducted at Visakhapatnam, Andhra Pradesh also found Road Traffic accident was greatly contributing for EDH in 58% of patients [10].

The EDH patients of the current study, presented with various signs and symptoms of head injury like nausea and vomiting (91.3%), headache and enlarged pupil (82.6%), loss of consciousness (65.2%), hemiparesis (39.1%), and confusion and slurred of speech (34.7%) and convulsions (17.3%). Variations in the symptomatology can be observed in a study done by Kumar *et al.*, where the majority of the patients had come up with loss of consciousness (95%) and vomiting (68%). In addition, other symptoms like headache (42%), ENT bleeding (42%), convulsions (11%), hemiparesis (11%), and facial weakness (2%) were also presented [10].

In the present study approximately 65.2% of the patients presented with moderate GCS score (9–12 score) and 34.7% of the patients presented with mild GCS score (13–15 score).

Comparable findings were observed in a study done by Zedan *et al.*, where 66.7% of patients had GCS score of 15/15 and 20% of patients had score of 14/15 [2].

Table 4 shows the comparison of location of EDH among different studies. In the current study, most of the patients (34.7%) presented with frontal EDH, followed by temporal hematoma (17.3%), Parietal hematoma (17.3%), Occipital hematoma (13%) and Posterior fossa hematoma (13%). Similar kind of findings were observed in a study done by Zwayed and Lucke-Wold, in which frontal EDH was majorly presented among all the patients [11].

**Table 2: The level of glasgow coma scale scoring**

Glasgow coma scale scoring	Frequency (%)
3–8	0
9–12	15 (65.2)
13–15	8 (34.7)

**Table 3: Location of extra dural hematoma**

Site of EDH	Frequency	Males	Females
Left frontal	5	5	0
Right frontal	3	2	1
Left temporal	1	0	1
Right temporal	3	1	2
Left parietal	1	1	0
Right parietal	3	2	1
Biparietal	1	0	1
Left parieto occipital	1	1	0
Right parieto occipital	2	2	0
Left posterior fossa	2	2	0
Right posterior fossa	1	1	0
Total	23	17	06

EDH: Extra dural hematoma

**Table 4: The comparison of location of extra dural hematoma among different studies**

Location of EDH	The present study (%)	In a study done by Zedan <i>et al.</i> (%)	In a study done by Zwayed and Lucke-Wold. (%)
Frontal	8 (34.7)	2 (13.3)	24 (38.7)
Parietal	4 (17.3)	8 (53.3)	17 (27.4)
Biparietal	1 (4.3)	-	1 (1.6)
Temporal	4 (17.3)	4 (26.7)	12 (19.3)
Posterior fossa	3 (13)	-	5 (8)
Occipital	3 (13)	1 (6.7)	3 (4.8)
Total	23 (100)	15 (100)	62 (100)

EDH: Extra dural hematoma

Different findings were observed in a study carried out by Zedan *et al.*, which revealed that parietal EDH was most commonly presented (53.3%), followed by frontal EDH (13.3%) [2].

Urgent craniotomy and evacuation of the epidural blood clot should be done in radiologically significant EDH. EDH with small volume (<30 ml) can be managed conservatively with good clinical and radiological outcome [12].

## CONCLUSION

In the present study we have found that, the EDH is largely encountered in middle age group (10–40 years) with male predominance and Road Traffic Accidents being the common mode of head injury. The study also revealed that frontal EDH is typical site of EDH due to head injury.

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## AUTHOR'S CONTRIBUTION

Mohammed Minhajuddin Harsoori designed the entire work. Mayukh Kamal Goswami and Arvind Kumar Tyagi contribute in making necessary correction and revision of the manuscript. The final draft was checked by all the authors.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## FINANCIAL ASSISTANCE

Nil.

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