

## RADIOLOGICAL EVALUATION AND MANAGEMENT OF EDH IN RANGARAYA MEDICAL COLLEGE, KAKINADA

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### ABSTRACT

#### BACKGROUND

EDH is the commonest emergency in the practice of Neurosurgery. Not all cases of EDH require surgical intervention. Our aim is to study the radiological evaluation which influences the line of management of EDH in Tertiary Care Centre - Rangaraya Medical College, Kakinada.

Head injury has become a leading cause of morbidity and mortality all over the world. In India the incidence of head injury has been increasing at a rapid pace.

Non-compliance with traffic rules doubled with alcohol consumption, poor condition of the roads and illiteracy are the major reasons for injuries in young individuals more often.

#### MATERIALS AND METHODS

This is a prospective study of 2 years duration conducted in Government General Hospital under Rangaraya Medical College, Kakinada, which is a Tertiary Referral Hospital, catering services to two large densely populated districts namely, East (52.86 lakhs) and West (39.36 lakhs) Godavari districts of Andhra Pradesh. All patients were taken up for CT scan at admission. Patients with effacement of ipsilateral ventricle or midline shift to opposite side or mass effect were operated immediately. Patients without the above signs were included in conservative group and after 6 hours, a repeat CT brain was done and after 2 days repeated again. Follow up scan done on 7th day and discharged after regression of symptoms. Repeat scans were done at follow up on outpatient basis again.

#### RESULTS

Total of 264 cases of EDH were treated in our hospital with an average follow up period of one month upto one year. Ratio of male to female 6:1 in our study. Conservatively treated cases were 185 & Surgery was done in 79 cases. Commonest location of EDH was temporoparietal region with a rare finding of bilateral EDH in seven patients, EDH in two regions on the same side was noted in one patient. We noted Infratentorial EDH in six cases, in which two patients were operated & four managed conservatively. The range of age of presentation in our study was 3 years to 76 years. Associated parenchymal lesions seen were SAH in 74 patients, SDH in 9 patients and Intracerebral Contusions in 24 patients. Commonly noted associated injuries were limb fractures. Existing medical dyscrasia seen in two patients. The timing of complete resolution: earliest -14 days with an average resolution of 21-46 days. Site of fracture and location of EDH were in the same region except in seven patients who did not have fracture. Two conservatively managed patients in whom EDH increased in volume required surgery after repeat scan done at 6 hours interval duration.

#### CONCLUSION

EDH is an emergency in Neurosurgery. Out of 264 cases 79 (29.8%) of EDH patients required surgery in our hospital. Patients with massive EDH expired in post-operative period. Time of presentation is important in predicting the overall post traumatic sequelae.

#### KEYWORDS

EDH, CT Brain, Traumatic Brain Injury.

**HOW TO CITE THIS ARTICLE:** Premjit Ray M, Sandhya K. Radiological evaluation and management of edh in Rangaraya Medical College, Kakinada. J. Evid. Based Med. Healthc. 2018; 5(52), 3562-3566. DOI: 10.18410/jebmh/2018/726

*Financial or Other, Competing Interest: None.*  
*Submission 04-10-2018, Peer Review 15-10-2018,*  
*Acceptance 06-12-2018, Published 19-12-2018.*  
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*DOI: 10.18410/jebmh/2018/726*



#### BACKGROUND

Head injury has become a leading cause of morbidity and mortality all over the world. Head on collision against any moving or immobile object while travelling on a two-wheeler has been the commonest mode of injury these days. Over speeding and not using helmet are also responsible for injuries in young individuals more often. These frictional forces result in stretching of the duramater at site of collision and it is a traumatic accumulation of blood in the potential space between the inner table of the skull and the stripped

off dural membrane.<sup>1</sup> Roy (1884) reported the first case of bilateral EDH.<sup>2</sup>

### Aims and Objectives

To study the Radiological Evaluation and Management of EDH pattern in Head Injury patients coming to Government General Hospital under Rangaraya Medical College, Kakinada.

- 1) Incidence of EDH in all head injuries
- 2) Evaluation of clinical course of EDH in head injuries
- 3) Need for surgery in EDH
- 4) Outcome, Prognosis and Sequelae of EDH

### MATERIALS AND METHODS

All patients diagnosed with EDH in the trauma patients presenting to Government General Hospital, Kakinada. This is a Prospective Study conducted from May 2016 to April 2018 for a period of 2 years. A total of 264 patients were included in the study out of the 2548 total head injury patients treated in our hospital. with a mean average follow up of 3-5 months and a range of 1 month minimum to maximum of 18 months. All trauma patients with CT findings of EDH were included in the study. Patients not coming for follow up were excluded from the study.

Following details were noted for all the patients-

- 1) Patient condition at the time of admission.
- 2) Mechanism of injury: RTA/fall/assault/others.
- 3) Under influence of alcohol – Yes/No.
- 4) Any associated injuries of limbs/chest injury/abd injury.
- 5) Radiological imaging-CT brain, x ray skull.
- 6) Mode of Management to be given.
- 7) Clinical course in the Hospital.
- 8) Prognosis, Discharge and Follow up.

### RESULTS

In the 2548 head injury patients treated in our hospital 264 patients had a CT finding of EDH (9.6%). The mean male female ratio of patients in our study is 6:1

	No. of Male pts	No. of Female pts
No. of patients	227	37
% of patients	85.80%	14.10%

**Table 1. Total No. of Patients- Sex Distribution**

The range of age presentation in our study was a young child with EDH at 3 yrs., Oldest male with EDH at 76 yrs. Mean age of presentation was 31.5 years.

Age in Years	No. of Patients	% of Patients
<18 yrs.	31	11.70%
19-35 yrs.	135	51.00%
36-50 yrs.	86	32.40%
>50 yrs.	12	4.50%

**Table 2. Total No. of Patients- Age Distribution**

The following were the details noted in the emergency department at time of admission of the patients.

GCS at Admission	No. of Patients	% of Patients
15	45	17.00%
12 – 14	157	59.40%
8 – 11	35	13.20%
4 – 7	19	7.10%
<3	8	3.30%

**Table 3. Glasgow Coma Scale at Admission of the Patients**

Mode of Injury	No. of Patients	% of Patients
RTA	152	57.70%
Self-fall	81	30.60%
Others	31	11.70%

**Table 4. Mechanism of Injury Involved**

History of Complaints	No. of Patients	% of Patients
LOC	185	70.00%
Vomiting	230	87.10%
Ear Bleed	134	50.70%
Seizures	34	12.80%

**Table 5. History of Complaints after the Injury Before Coming to Hospital**

Other characteristic findings noted in patients with EDH were:

- 1) 186 patients (70.4%) under influence of alcohol
- 2) Medical illness / blood dyscrasias: 2 patients
- 3) Cervical spine injuries: 6 patients (2.2%)
- 4) Rib fractures: 19 patients (7.1%)
- 5) Limb injuries & fractures: 73 patients (27.6%)
- 6) Other organ injuries: 23 patients (8.7%)

### Mode of Management of Patients

After a detailed examination of the patients in the emergency department & corresponding radiological details of the size, location, mass effect if any, all patients were classified accordingly into conservative & surgery groups on discretion of the chief of our department.

Group	No. of Male pts	%	No. of Female pts	%	Total
Conservative	171	92.40%	21	11.30%	185
Surgery	68	78.70%	16	21.20%	79

**Table 6. Division of Patients according to Type of Management**

Type of Injuries	No. of Patients	% of Patients
<b>Extracranial injuries</b>		
Scalp Lacerations	201	76.10%
Facial Injuries	174	65.90%
<b>Fractures</b>		
Comminuted #	135	51.10%
Closed Depressed #	39	14.70%
Closed Undisplaced #	83	31.40%
No Fracture	7	2.60%
<b>Intracranial Findings</b>		
Pneumocephalus	27	10.20%
Sub Dural Haematoma	19	7.10%
Intracerebral Contusions	14	5.30%
Sub Arachnoid Haemorrhage	74	28.30%
Diffuse Axonal Injury	31	11.70%

**Table 7. Clinical & Radiological Findings of the Patients**

Region of EDH	No. of Patients	% of Patients
Frontal	57	21.50%
Temporal	21	7.90%
Occipital	9	3.40%
Temporoparietal	88	33.30%
Parietooccipital	76	28.70%
Bifrontal	7	2.60%
Infratentorial	6	2.27%
Bilateral on Same Side	1	0.03%

**Table 8. Region of the EDH in CT brain**

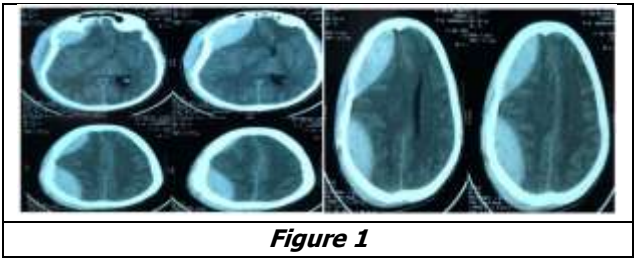


Figure 1

**In the Conservative Group**

Repeat CT brain done at 6 hrs., after 72 hrs. for all patients.

Increased haematoma: within 6 hrs: 6 patients (2.2%)

- fig 2A & 2B.

Decrease haematoma: within 6 hrs: 1 patient (0.03%)

- fig 3A & 3B.

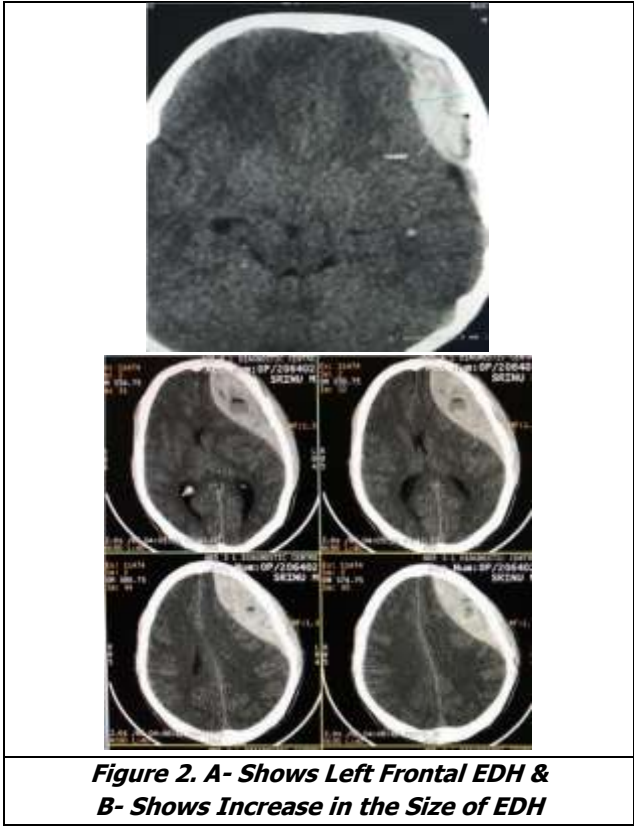


Figure 2. A- Shows Left Frontal EDH & B- Shows Increase in the Size of EDH

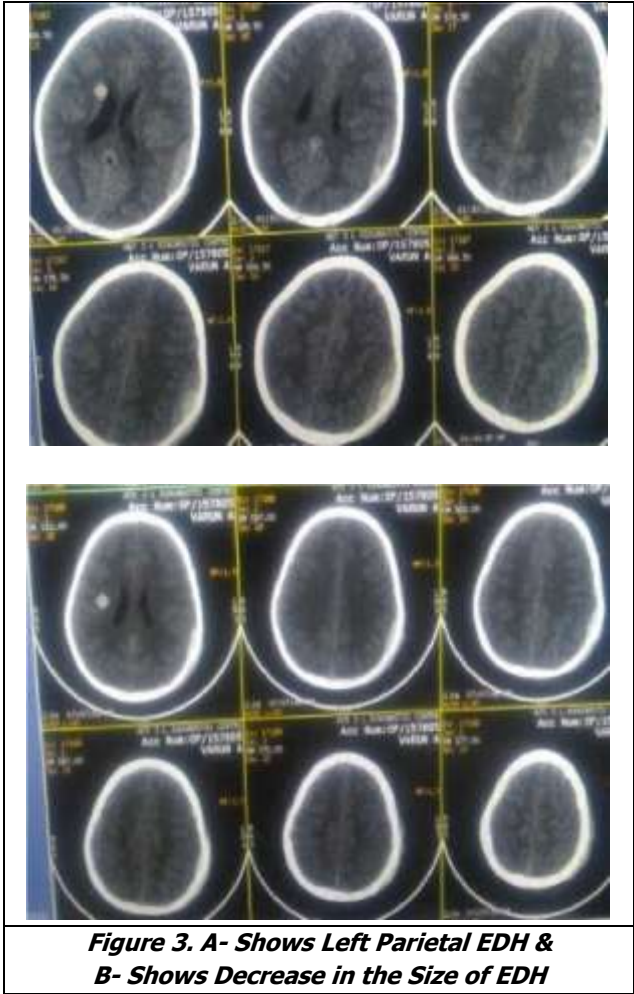


Figure 3. A- Shows Left Parietal EDH & B- Shows Decrease in the Size of EDH

Complaints noted during the hospital stay in conservative group-

Day 1 complaints: vomiting, drowsiness, severe headache

Day 2 complaints: dizziness, giddiness, severe headache

Day 3 complaints: giddiness, severe headache

Day 5 complaints: moderate headache, giddiness

Day 7 complaints: mild headache

### Progress of Disease

2 Patients had increased haematoma in the repeat imaging after 6 hours were taken up for immediate surgery.

### Resolution

Mean time of Complete resolution was 14-46 days.

### Timing of Discharge

All patients were discharge on or after 7-10 days interval in conservative group.

After doing a repeat scan on the before day of discharge showing – regression signs of haematoma: decrease size, change in density all discharged with well informed about warning signs.

### In Surgery Group

All patients with haematoma more than 60 cc causing ipsilateral effacement of ventricles ± midline shift were taken up for immediate surgery.

### Procedure Done

Craniotomy & evacuation ± removal of comminuted bone fragments

Post-operative – 1 patient required resurgery (0.03%).

Common Complications noted were wound infection / Bone flap necrosis / osteomyelitis. Morbidity noted in patients with other intracranial traumatic insults.

Mortality noted 9 cases (6 massive EDH, 3 Intracerebral contusions).

Discharged after suture removal after 8-15 days

### Prognosis & sequelae in our study in both groups

Two conservatively managed patients required surgery. Patients with massive EDH expired in post op period.

One patient had bilateral papilloedema in conservatively managed EDH In ear bleed patients – ringing sensation in ears & giddiness was present, it resolved in 2-8 wks. with conservative treatment. Patients with temporal bone

fractures had facial palsy, it resolved with conservative measures in all patients except 5.

Black eye / discolouration was resolved within 3-8 weeks follow up:

5 patients were not available for follow up, they were excluded from the study.

1<sup>st</sup> visit: one week following discharge.

2<sup>nd</sup> visit: for symptomatic patients after 10 days for asymptomatic patients after 3 wks.

3<sup>rd</sup> visit: all patients were advised for a repeat CT brain for assessment of resolution of the haematoma.

GOS at Admission	No. of Patients in Conservative Group	No. of Patients in Surgery Group
Death - 1	0	9
Vegetative state - 2	0	3
Severe - 3	1	7
Moderate - 4	9	12
Good recovery	184	48

**Table 9. Glasgow Outcome Scale of the Patients**

### DISCUSSION

Head injury remains the most common cause of death and disability among children and young adults. Fortunately, patients with extradural hematoma (EDH) are generally treatable and often have a favourable clinical outcome.<sup>2</sup>

The mortality rate associated with this condition has improved radically since the time of Rose and Carless, who in 1927 reported mortality rates of 86%. Since the first description, the epidural hematoma was considered a neurosurgical emergency and an urgent evacuation was recommended, in order to prevent neurological sequelae or even death. This dogma has been reconsidered. There were many cases of EDH reported in the literature, sometimes of considerable size, with good outcome even if they are not treated surgically.<sup>3,4</sup>

However, with the advent of CT, an increasing number of patients receive imaging despite minimal neurologic findings. In some cases, an EDH may be identified, and the surgeon must decide whether to recommend surgical intervention. Despite the risks of a serious and untreated EDH, it has become increasingly apparent that many small epidural hematomas resolve with nonsurgical management without neurologic sequelae.

Criteria for Comparison	Our Study	Hao Chen et al <sup>5</sup>	Young Ha Jeong et al <sup>6</sup>	Kumar CS Et al <sup>7</sup>	Bhau K S Et al <sup>8</sup>
Total no of cases of EDH in total head injury cases	264/2548	38/412	377/2698	100 cases of EDH	120 cases of EDH
Incidence of EDH	10.30%	9.20%	13.90%	-	-
Mean age of presentation	31.5 years	35.4 years	39.7 years	23 years	-
Paediatric	11.70%	9.20%	24.40%	28.00%	-

EDH					
Road Traffic Accident	57.70%	67.10%	31.50%	58.00%	-
Mean GCS at Presentation	12.8	8.2	63.5% Mild Grade of Head Injury	15 in 40% Cases	>12 in 95%
Influence of Alcohol	70.40%	-	-	63.00%	-
Conservatively Treated	70.20%	21.00%	75.50%	43.00%	55.80%
Surgically Treated	29.80%	79.00%	24.50%	57.00%	44.10%
Bilateral EDH	2.60%	-	-	-	-
Posterior Fossa EDH	2.27%	-	-	<5%	2.5%
Mortality	11.90%	-	-	8.00%	5.00%
Glasgow Outcome Scale	87.70%	63.20%	87.30%	79%	90.00%
<b>Table 10. Our Study Results in Comparison to Results from Other Studies</b>					

The drawbacks in our study were less period of study and the size of sample.

No funding sources and no conflict of disclosure.

This study was approved by the Ethics Committee of the Rangaraya Medical College & Government General Hospital, Kakinada.

## CONCLUSION

EDH is life threatening & requires prompt intervention. 29.8% of EDH patients required surgery in our hospital. Serial CT brain imaging at regular/necessary intervals showed good prognostic factor for the resolution of the haemorrhagic process. Time of presentation is important in predicting the overall post-traumatic sequelae. Delayed presentations & EDH >120 cc clot had poor recovery. Quick & timely management can decrease morbidity & mortality.

Active awareness among public regarding the importance of immediate care in head injuries will improve the time delay in bringing the patient to a local available hospital.

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