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A CLINICAL STUDY OF PATIENTS WITH CONSERVATIVELY MANAGED EXTRA DURAL HEMATOMA AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Head injury causes accumulation of blood between the rigid skull and the outer endosteal layer of the dura mater. If the volume of extradural hematoma is less than 30 ml volume, it may not require surgery based on neurological examination. **Objectives:** To study the various causes, factors influencing and outcome of conservatively management in Extra Dural Hematomas. **Materials and Methods:** A total of 23 Extra Dural Hematoma cases requiring conservative management were included in the study. All the patients were subjected to complete neurological examination including and various imaging techniques like CT brain and chest X-ray. The patients with volume<30ml, thickness<5 mm, midline shift<5 mm, GCS >8, were subjected to conservative management by admitting the patients in Intensive Care Units (ICU). **Results:** Among 23 EDH cases, 17 (74%) cases were males and 6(26%) cases were females. The mean age of patients was 26.7years. Road traffic accident was the common mode of injury in 47.8% (11 cases) of patients. Mean volume of hematoma was 20.5ml and GCS Score was mild to moderate group. The majority of the patients (34.7%) presented with frontal EDH. Among 23 cases, 91.3% of the patients were discharged with good recovery. **Conclusion:** Extra Dural Hematoma (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.

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 per 1,00,000 per year at the global level. There is inconsiderable epidemiological information of Traumatic Brain Injuries in India due to lack of

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systematic research efforts. The only epidemiological study undertaken in Bangalore by the authors has revealed that the incidence, mortality and case fatality rates were 150/1,00,000, 20/1,00,000 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, Extra Dural Hematoma (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 extra dural hematoma 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 greater than 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 10-55ml, they can be managed with conservatively without any surgery [5]. The present study intends to study the various causes, factors influencing and outcome of conservatively management in Extra Dural Hematomas.

MATERIALS AND 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 one year, after getting approval from Institutional Ethics Committee (Ref.: MMC/IEC/27/2021-22). A total of 23 cases of Extra Dural

Hematoma (EDH) were included in the study. A complete trauma evaluation was carried out in all the patients. A detailed history was taken such as demographic details, mode of injury, time interval to bring hospital. All the patients were subjected to complete neurological examination including a thorough evaluation for evidence of traumatic sequelae and associated neurological deficits, skull fractures, hematoma, laceration, and Glasgow Coma Scale (GCS) score. The patients were ruled out for CSF otorrhoea or rhinorrhoea, hemotympanum, muscular weakness, aphasia, visual field defects, numbness, ataxia. The vital parameters were noted and level of consciousness was assessed. Along with routine lab investigations, various imaging techniques were carried out including like CT brain and chest X-ray.

The patients with extra dural hematoma volume <30ml, total thickness of hematoma <5 mm, midline shift of the brain <5 mm, Glasgow coma scale (GCS) score >8, and if there are no other surgical lesion of the brain 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 dehydrating agent Mannitol and cerebro-protective agent Citecholine is given by intravenous route. The follow up CT Brain was done at 6 hours, 12 hours, 24 hours and 48 hour after admission. If the patient showed any signs of localized brain compression or herniation, the patients were immediately taken for craniotomy. After 3days of conservative treatment 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 one 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 Extra Dural Hematoma 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. A total of 8 patients were with age group of 10-20years, 7 patients were with age group of 21-30years and 8 patients were with age group of 31-40years. The mean age of patients was 26.7years. The mean age of male patients was 27.8 years and the mean age of female patients was 28.1 years. 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 were seen in 34.7% of patients. Approximately 65.2% of the patients presented with moderate GCS score (9-12score) and 34.7% of the patients presented with mild GCS score (13-15score).

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 modes 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. 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 (4cases), Parietal hematoma (4cases), Parietal occipital hematoma (3cases) and posterior fossa hematoma (3cases) were also encountered. Among 17 male patients, 15 patients had favorable or good outcome and two patients had to be taken for surgical evacuation due to poor prognosis with conservative treatment where they showed moderate recovery. All female patients (06 cases) have shown favorable outcome. Zero mortality was seen in the present study.

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 Extra Dural Hematoma [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.

Table No: 01 Findings of the present study

SNo	Results	Male	Female
1.	Gender distribution	17	06
2.	Age		
	• 10-20yrs	06	02
	• 21-30yrs	06	01
	• 31-40yrs	05	03
3.	Mean Age (years)	27.8±14.3	28.1±14.8
4.	Signs and Symptoms		
	• Nausea & Vomiting	15	6
	• Headache	11	6
	• Loss of Consciousness	5	1
	• Enlarged pupil	4	2
	• Confusion	12	5
	• Hemiparesis	2	0
	• Convulsions	3	0
5.	GCS Score		
	• 3-8 score	01	00
	• 9-12 score	09	05
	• 13-15 score	07	01
6.	Mode of head injury		
	• Road traffic accidents	07	04
	• Blunt trauma head/ Assault	03	01
	• Fall from height	02	01
	• Alcohol intoxication	05	00
7.	Mean volume of Hematoma (ml)	21.4±13.1	19.6±11.4
8.	Site Of EDH		
	• Left Forntal	5	0
	• Right Forntal	2	1
	• Left Temporal	0	1
	• Right Temporal	1	2
	• Left Parietal	1	0
	• Right Parietal	2	1
	• Biparietal	0	1
	• Left Parieto Occipital	1	0
	• Right Parieto Occipital	2	0
	• Left Posterior Fossa	2	0
	• Right Posterior Fossa	1	0
9.	Outcome		
	• Favorable outcome	15	06
	• Moderate recovery	02	00
	• Mortality	00	00

In a study carried out by Bhavuk Kapoor 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. These findings can be compared with the present study where male predominance (73.9 %) was seen in young adults (10-20 years and 30-40years of age group) [9].

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 CS 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 (9-12score) and 34.7% of the patients presented with mild GCS score (13-15 score). Comparable findings were observed in a study done by Amr A. El-Saghir 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 2 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 A. Rahim H et al, in which fontal EDH was majorly presented among all the patients. Hence, from both studies it can be concluded that frontal EDH is most common type of presentation in road traffic accidents [11]. Different findings were observed in a study carried out by Amr A. El-Saghir Zedan et al, which revealed that Parietal EDH was most commonly presented (53.3%), followed by Frontal EDH (13.3%) [2]. From the table 2, it can be observed

that the most common location of the EDH was frontal area of skull which has higher risk of injury during road traffic accidents.

Table 2: Comparison of location of EDH among different studies

Location of EDH	This study	Study by Amr	
		A. El-Saghir Zedan et al	Study by A. Rahim H et al
Frontal	08 (34.7%)	02 (13.3%)	24 (38.7%)
Parietal	04 (17.3%)	08 (53.3%)	17 (27.4%)
Biparietal	01 (4.3%)	-	01 (1.6%)
Temporal	04 (17.3%)	04 (26.7%)	12(19.3%)
Posterior fossa	03 (13%)	-	05(8%)
Occipital	03 (13%)	01 (6.7%)	03(4.8%)
	23 (100%)	15 (100%)	62 (100%)

Urgent craniotomy and evacuation of the epidural blood clot should be done in radiologically significant EDH. EDH with small volume (less than 30ml) can be managed conservatively with good clinical and radiological outcome [12]. In the present study 91.3% of the patients were discharged with good recovery and 8.6% of patients showed moderate recovery. None of the admitted patient died during conservative treatment or after surgical management. In a recent study carried out by Muhammad Abd-ur-Rehman in 2021, in which the outcome of conservative and surgical managed groups was compared and among the conservative management group, all the 50 cases have showed favorable outcome [13].

We were able to achieve zero mortality among 23 cases because of sensitive selection of EDH cases for conservative management. And intensive monitoring could be another reason for good recovery. The current study also has a limitation of smaller sample size. In future, similar type of studies can be conducted in larger sample size to avoid unnecessary craniotomy in patients with mild to moderate EDH who can be treated with conservative therapy.

CONCLUSION

In the present study we have found that, the extra dural hematoma is largely encountered in middle age group (30-40years) 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.

FINANCIAL ASSISTANCE

Nil

CONFLICT OF INTEREST

The authors declare no conflict of interest

AUTHOR 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

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