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A STUDY OF CLINICO-RADIOLOGICAL PROFILE AND OUTCOME OF EXTRADURAL HAEMATOMA – A CASE SERIES STUDY

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ABSTRACT
Traumatic extradural haematoma (EDH) is a neurosurgical emergency and timely surgical intervention for significant EDH is the gold standard. The aim of this study is to review the cause, clinico-radiological profile and outcome of traumatic EDH cases admitted in Neurosurgery department. A case series study of 57 patients with traumatic extradural haematoma was carried out in the setting of tertiary care hospital in the department of Neurosurgery, Vijayanagara Institute of Medical Sciences, Bhallari, who were admitted between Jan 2012 to Jan 2014. Variables included in the analysis were age, sex, clinical profile and radiological profile variables. Outcomes were assessed by Glasgow Outcome Scale score(GOSS). A total of 57 patients diagnosed with extradural haematoma were included in the study. The proportion of EDH was more in the second and third decades of life, with a mean age of 26.45 ± 14.17 years. Majority of them were males (91.2%) and females were (8.8%). In majority of patients RTA (84.2%) was cause of injury followed by falls (15.8%). The most common location of haematoma was tempero-parietal 20(35%), followed by frontal 17(29.8%). Associated skull fracture was present in 42(73.7%), parenchymal brain injury in 5(8.8%) patients and axonal injury in 3(5.3%) patients. Midline shift was seen 10(17.5%) of the patients. The mean thickness (size) of the haematoma was 25.1 ± 18.9 mm, ranging from 18 mm to 40 mm. The outcome was assessed by using Glasgow Outcome Scale score where in 24(42%) patients had excellent outcome with GOSS of 5(Low Disability), 25(43.9) patients had good outcome with GOSS of 4(Moderate Disability). We conclude that early appropriate treatment of EDH results in good high quality survival (Glasgow Outcome Score 4 or 5). Low GCS should not be an absolute contraindication for surgery. Seizure prophylaxis should be considered in all cases.

INTRODUCTION

Head injuries are a major cause of morbidity and mortality in the community and are one of the most common reasons for attending accident and emergency departments. Head injury is the leading cause of death in the agegroup of 16 to 40 years [1]. Extradural haematoma, (EDH) a collection of blood between the skull and duramater due to bleeding from extra cerebral vessel is a commoncomplication of head injury, often fatal if not treated intime [2]. After the advent of Computed Tomography (CT), the diagnosis of extradural haematoma has increased considerably where in the incidence of EDH among traumatic braininjury (TBI) patients has been reported to be in the rangeof 2.7 to 4% and 9% of patients with coma have EDH [3,4].

The peak incidence of extradural haematoma (EDH) is in the second decade of life as the dura is able to strip more readily off the underlying bone. Mean age of patient with EDHin different series is between 20 and 30 years of age. There is classically a lucid interval following the trauma. Extradural haematomas account for two third

of all traumatic intracranial haematomas in the under 20 age group but only 5% of haematomas in patients over 50 years. [3-7].

METHODOLOGY

A case series study of 57 patients with traumatic extradural haematoma was carried out in the setting of tertiary care hospital in the department of Neurosurgery, Vijayanagara Institute of Medical Sciences, Bellary, who were admitted between Jan 2012 to Jan 2014.

All patients with head injury underwent CT scan brain (plain) and patients with radiological evidence of extradural haematoma were included in the study. Both primary and delayed onset EDH and with other associated intracranial lesions were included for the study.

Variables included in the analysis were age, sex, clinical profile, associated severe extracranial injury, cause of injury, time of presentation, pupillary response, hematoma thickness, severity of head injury (Glasgow Coma Scale score < or = 8), parenchymal brain injury, and diffuse axonal injury. Outcomes were assessed by Glasgow Outcome Scale score (GOSS) [8].

RESULTS

A total of 57 patients diagnosed with extradural haematoma were included in the study. The proportion of EDH was more in the second and third decades of life, with a mean age of 26.45 ± 14.17 years. Majority of them were males (91.2%) and females were (8.8%).

In majority of patients RTA (84.2%) was cause of injury followed by falls (15.8%).The average time lag before presentation was 56.2 hours.Most common clinical presentation washeadache/vomiting (82.5%/65%) followed by unconsciousness (52.6%) and seizures were present in 12.3% of the patients. On admission majority of them 50(87.7%) had a GCS of 9-12, 6 (10.5%) had GCS of 3-8 and 1 (1.8%) patient had GCS of 13-15.The pupils were reactive in 43(75.4%) patients, sluggishly reactive in 10(17.5%) and non-reactive in 4(7%).

The most common location of haematoma was tempero-parietal 20(35%), followed by frontal 17(29.8%). Associated skull fracture was present in 13(22.8%), parenchymal injury in 5(8.8%) patients and axonal injury in 3(5.3%) patients. Midline shift was seen 10(17.5%) of the patients. The mean thickness (size) of the haematoma was 25.1 ± 18.9 mm, ranging from 18 mm to 40 mm.

All the patients were operated to evacuate the haematoma. The outcome was assessed by using Glasgow Outcome Scale score,**[8]** where in 24(42%) patients had excellent outcome with GOSS of 5(Low Disability), 25(43.9) patients had good outcome with GOSS of 4(Moderate Disability), 4(7%) patients had GOSS of 3(Severe Disability), 2(3.5%) of patients had GOSS of 2(Persistent Vegetative state) and 2(3.5%) patients died (GOSS of 1).

Figure 1. Showing tempero-perietal EDH with midline shift. Post-operative CT scan of the same showing complete evacuation following craniotomy

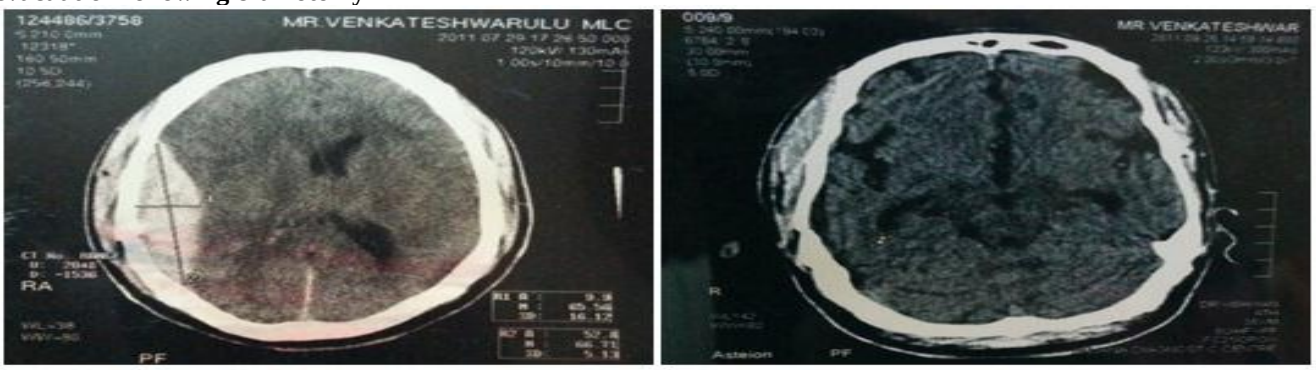

Figure 2. Showing Frontal EDH with midline shift. Post operative CT scan of the same showing complete evacuation following craniotomy

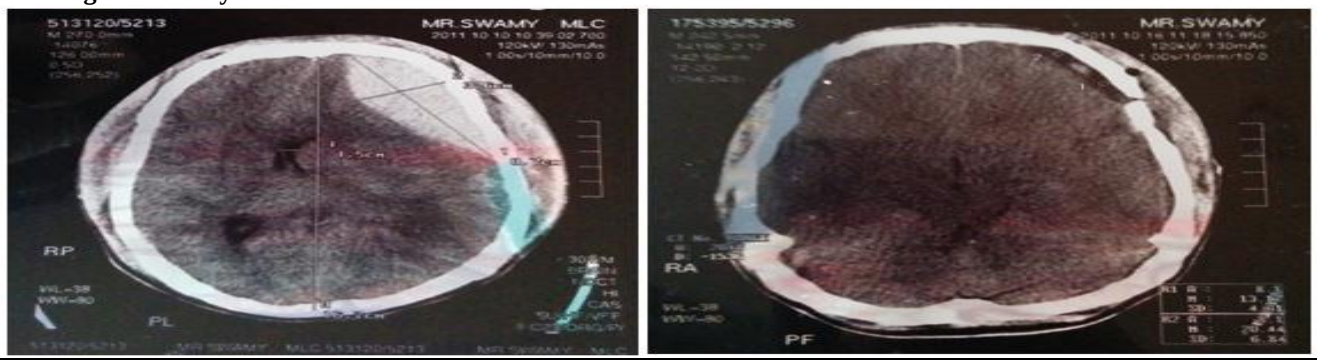

Table 1. Age and sex wise distribution of the patients

Age in Years	Frequency	Percentage
≤ 10 years	4	7.0
11 - 20 years	13	22.8
21 - 30 years	18	31.6
31 - 40 years	11	19.3
41 - 50 years	3	5.3
> 50 years	3	5.3
Total	57	100.0
Mean ± SD	26.45 ± 14.17	
Sex		
Male	52	91.2
Female	5	8.8
Total	57	100.0

Table 2. Clinical Profile of the patients

Variable		Frequency	Percentage
Cause of injury	RTA	48	84.2
	Falls	9	15.8
Average time lag before presentation		52.2 hours	
Symptoms	Headache	47	82.5
	Vomiting/nausea	37	64.9
	Confusion/dizziness	5	8.8
	Unconsiousness	30	52.6
	Seizures	7	12.3
Glasgow coma scale	GCS: 13-15	1	1.8
	GCS: 9-12	50	87.7
	GCS: 3-8	6	10.5
Pupil reactivity	Reactive	43	75.4
	Sluggish reactive	10	17.5
	Non reactive	4	7.0

Table 3. Radiological Profile of the patients

Variable		Frequency	Percentage
Size of EDH	< 20 mm	17	29.8
	> 20 mm	40	70.2
	Mean ± SD	2.51 ± 1.89 mm	
Location	left frontal EDH	7	12.3
	left frontoparietal EDH	4	7.0
	left occipital EDH	6	10.5
	leftparieto-occipital EDH	1	1.8
	left tempero-parietal EDH	12	21.1
	Right frontal EDH	10	17.5
	Right fronto-parietal EDH	2	3.5
	Right parietal EDH	6	10.5
	Right tempero-parietal EDH	8	14.0
	Right fronto-tempero-parietal EDH	1	1.8
	Total	57	100.0
Skull fracture		42	73.7
Midline shift		10	17.5
Parenchymal brain injury		5	8.8
Axonal injury		3	5.3

Table 4. Treatment Outcome of the patients

Glasgow outcome scale score	Frequency	Percentage
1. Death	2	3.5
2. Persistent vegetative state	2	3.5
3. Severe disability	4	7.0
4. Moderate disability	25	43.9
5. Low disability	24	42.1
Total	57	100
Mean length of hospital stay	11.68 ± 2.58 days	

DISCUSSION

Extradural haematoma, (EDH)a collection of blood between the skull and duramater due to bleeding from extra cerebral vessel is a commoncomplication of head injury, often fatal if not treated intime [2]. After the advent of Computed Tomography (CT), the diagnosis of extradural haematoma has increased considerably where in the incidence of EDH among traumatic braininjury (TBI) patients has been reported to be in the rangeof 2.7 to 4% and 9% of patients with coma have EDH [3,4]. The peakincidence of extradural haematoma (EDH) is in the second decade of life as the dura is able to strip more readily off the underlying bone. The mean age of patient with EDH in different series is between 20 and 30 years of age. In the present study mean age with EDH was 26.5 years which is in consonance with other case series studies. There is classically a lucid interval following the trauma. Extradural haematomas account for two third of all traumatic intracranial haematomas in the under 20 age group but only 5% of haematomas in patients over 50 years.[3-7] Majority of EDH was more commonly seen among males (91%) compared to females (9%). This study findings are inconsonance with other studies.[9,10] The male dominance among the victims of EDH is due to the our social culture where most of the females are housewives who are not exposed to external work.

In this series, road traffic accidents (RTA) was the commonest cause of injury comparable with many other published series but in pediatric age group, fall was the leading cause of EDH [2,3,9,11]. EDH is more frequently located in the temporoparietal and temporal region as compared with other locations which was evident in our study and other case series studies [2,3,10-14]. Previous studies shows 12 to 42 % of patients remained conscious throughout the time between trauma and surgery, and papillary abnormalities are observed in between 18 and 44% of patients. similar findings were observed in our study [3,11,15,16]. In the present study associated skull fracture was found in 22.8% of cases, parenchymal brain injury in 8.8% and axonal injury in 5.3% of the cases. In other studies, similar intracranial lesions are found in between 30 to 55% of adults with surgically evacuated EDH and these are predominantly contusion; intracerebral hemorrhages followed by subdural haematoma and diffuse brain swelling [3,4,11-17]. All the patients were operated to evacuate the haematoma. The outcome was assessed by using Glasgow Outcome Scale score [8] where in 24(42%) patients had excellent outcome with GOSS of 5(Low Disability), 25(43.9) patients had good outcome with GOSS of 4(Moderate Disability), 4(7%) patients had GOSS of 3(Severe Disability), 2(3.5%) of patients had GOSS of 2(Persistent Vegetative state) and 2(3.5%) patients died (GOSS of 1). Similar outcomes were observed by Gerlach R et al [18] and Cheung PS et al [9]. In one of the study conducted by Lee et al [19] they identified four independent predictors of unfavorable outcome after surgery for EDH, they being associated brain lesions, low GCS,papillary abnormalities and raised Intra Cranial Pressure(ICP). Associated brain lesions as one of independent predictor of unfavourable outcome of EDH has been confirmed by several others [3,16,20,21].

GCS before surgery is the single most important predictor of outcome in patient with Extradural Haematoma undergoing surgery was observed in other studies [3,7,19,22]. Contrary to the above predictors of outcome, a study by Gerlach R et al [18]showed that none of the tested variables were found to have a prognostic relevance as tested by multivariate analysis where in regardless of the EDH size, the clinical status of the patients, the abnormal pupillary findings, or the cause of injury, the outcome and prognosis of the patients with EDH are excellent. The highest mortality (74%) was found in patients of EDH with subdural haemorrhage and a GCS between 3 and 5. Patient with an EDH and a GCS of 3 to 5 had a mortality of 36% and patients with an EDH and a GCS of 6 to 8 had a mortality of only 9% [3].

CONCLUSION

Extradural haematoma is a well-recognized and most rewarding neurosurgical emergency. It must be recognized and evacuated early to prevent potential mortality and morbidity. From our case series study of surgically managed cases we can conclude that whenever surgical treatment is indicated, early surgical intervention is associated with the best prognosis. Many factors affects the outcome of extradural haematoma surgery and the most important one is the duration of time between incident/accident and neuro-surgical intervention; mortality can become near to nil if this time interval can be made as short as possible with absence of associated intracranial injury. We conclude that early appropriate treatment of EDH results in good high quality survival (Glasgow Outcome Score 4 or 5). Low GCS should not be an

absolute contraindication for surgery. Seizure prophylaxis should be considered in all the patients.

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