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TRAUMATIC EXTRADURAL HAEMATOMA – AN INSTITUTIONAL EXPERIENCE OF ONE YEAR AT A TERTIARY CARE CENTRE IN SOUTH INDIA

Neurosurgery

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ABSTRACT

Introduction Acute traumatic extradural hematoma (EDH) is a life threatening condition and requires early diagnosis and prompt intervention. It is most frequently caused by traumatic head injury. In this study we analyse the incidence and outcome of consecutive patients with EDH managed at our institute. **Materials and Methods:** This is a retrospective study of all consecutive patients with acute traumatic EDH admitted and managed in Madras Medical College & Rajiv Gandhi Govt. General Hospital, Chennai, India between February 2019 and January 2020. All patients were analyzed and age, sex, cause of injury, time of presentation, Glasgow Coma Score (GCS), treatment and clinical outcomes were determined. **Results:** Of 3880 head injuries, 219 (5.64%) had EDH. Males were 188 (85.84%) and females 31 (14.16%). Peak age of incidence was the third decades of life, with a mean age of 33.23 years. Causes were road traffic accidents 156 (71.23%), falls 35 (15.98%) and assault 28 (12.78%) Majority of patients 180 (82.19%) presented within 24 hrs of injury but only few patients 52 (23.74%) presented within 4 h. At presentation 99 patients (45.20%) had GCS of 13-15, 72 patients (32.88%) had 9-12 and 48 (21.92%) had 3-8. The most common location of hematoma was temporo-parietal 131(59.82%). 71(32.42%) patients was operated while 148(67.58%) were managed conservatively. The mortality rate was 12.78% (28 patients) and of these 67.86% had GCS <8. **Conclusion:** Early diagnosis and appropriate treatment are the cornerstone in the management and it results in the high quality survival (Glasgow Outcome Score 4 or 5) of EDH patients. Low GCS should not be a deterrent in the decision for prompt surgical intervention. All patients should be considered for early seizure prophylaxis with GCS <8.

KEYWORDS

Extradural hematoma, Head injury

INTRODUCTION

Acute extradural or epidural hematoma (EDH) is a neurosurgical emergency and early surgical intervention for significant EDH is the accepted standard for treatment. Acute EDH occurs in approximately 1-3% of patients with head injuries and in 5 to 15% of patients with severe head injuries.[1] It is rare before the age of 2 years and after 60 years and has a male to female ratio of about 4:1. Computed tomography (CT) scan remains the imaging modality of choice for diagnosis.[2,3] The decision regarding the treatment of EDH has to be made individually in each case depending on hematoma size, location and patient's neurological status.[4]

Early diagnosis and effective treatment reduces mortality and improves outcome. Mortality was 20-55% prior to the CT era but now this has improved to about 12-20%.[5] The standard recommendation for symptomatic patients is surgical evacuation within the golden hours.[6] However, neurosurgical service in developing country like India is still evolving and as such, there tends to be an unacceptable delay before the patients reached to a competent neurosurgical center. There are many factors acting independently that affect outcome in patients with acute traumatic EDH. Admission Glasgow Coma Score (GCS) and the presence of associated intracranial lesions appear to be the most important predictors of outcome.[7,8] Other important factors that determine outcome includes the age of the patient, time from injury to treatment, GCS on admission, CT findings (hematoma volume, degree of midline shift, associated intradural lesion).[7] Associated co-morbidities and the injury severity score (ISS) in cases of polytrauma may also affect eventual outcome.

Zero mortality from acute extradural hematoma is a realistic goal for a modern, tertiary care neurosurgery centre for head-injured.[9] In developing countries with inadequate manpower and lack of essential diagnostic services, factors like late recognition and delay in seeking expert intervention may also indirectly affect the outcome in these patients. Therefore, results from developing countries in terms of morbidity and mortality may not be at peer with reports from developed countries with more streamlined healthcare services.

This is a study of incidence and outcome of consecutive patients with traumatic EDH managed in tertiary care centre in Madras Medical College & Rajiv Gandhi Govt. General Hospital, Chennai, India.

MATERIALS AND METHODS

This is a retrospective study of all consecutive patients with acute traumatic extradural hematoma admitted and managed at our institute between February 2019 and January 2020. Acute EDH was diagnosed by CT scan in all cases. All patients were analyzed with regard to age, sex, cause of injury, time of presentation, Glasgow Coma Score (GCS) at admission, treatment and clinical outcomes.

RESULTS

Of 3880 head injuries which presented to our casuality, 219 (5.64%) had EDH. Males were 188 (85.84%) and females 31 (14.16%). Peak age of incidence was the third decades of life, with a mean age of 33.23 years (Table 1).

Table 1: Age distribution of patients

AGE GROUP	FREQUENCY	PERCENTAGE
0-10	16	7.3%
11-20	28	12.78%
21-30	66	30.13%
31-40	40	18.26%
41-50	45	20.55%
51-60	17	7.76%
61-70	6	2.73%
71-80	1	0.45%

Causes were road traffic accidents 156 (71.23%), falls 35 (15.98%) and assault 28 (12.78%).(Figure 1).

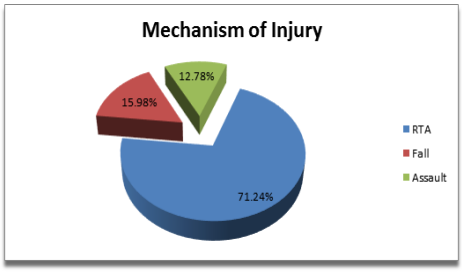

Figure 1: Mechanism of injury

Majority of patients 180 (82.19%) presented within 24 h of injury but only few patients 52 (23.74%) presented within 4 h.

At presentation 99 patients (45.20%) had GCS of 13-15, 72 patients (32.88%) had 9-12 and 48 (21.92%) had 3-8.(Figure 2).

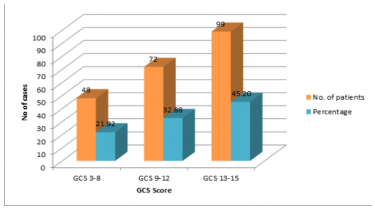

Figure 2: Distribution of patients according to GCS

The location of hematoma was temporo-parietal 131(59.82%), frontal 43(19.63%), parieto-occipital 32(14.61%) and posterior fossa 13(5.94%) as shown in Figure 3.

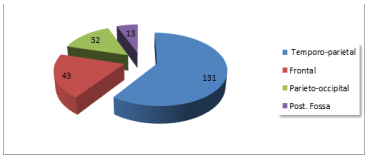

Figure 3: Distribution of patients according to site of hematoma.

71(32.42%) patients was operated while 148(67.58%) were managed conservatively (Figure 4). Amongst operated group 60 (84.51%) were male while 11 (15.49%) were female and amongst conservative group, 128 (86.49%) were male and 20 (13.51%) were female. However a total of 11 (35.48%) female out of 31 total admitted female patient and 31.91%(60 out of 188 males admitted) were operated, suggesting slightly higher percentage of operative intervention needed in female patients.

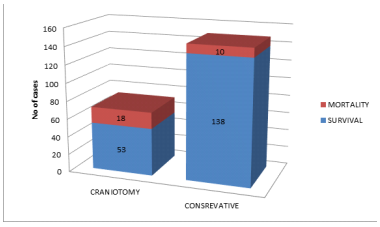

Figure 4: Treatment modality in the present study.

28 patients (12.78%) died and of these 67.86% had GCS <8. Amongst death, 18 (64.28%) were operated and 10 (35.72%) were conservatively managed. In the operated group who died, 16 (88.88%) were male and only 2(11.12%) were females. A total of 2 (18.18%) out of 11 total operated female patient and 26.67% (16 out of 60 males operated) patients died, suggesting slightly higher percentage of mortality in male patients.

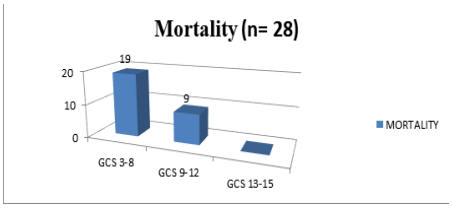

Figure 5: Distribution of mortality according to GCS at admission

There was direct co relation between GCS at admission and mortality. In the severe head injury group (GCS 3-8), 19(67.86%) patients died while rest of 9(32.14%) patients were in the GCS 9-12 group. On the other hand there were no deaths among GCS 13-15 as shown in figure 5.

21 (9.58%) patients presented with hemiparesis of varying grades associated with increased volume of EDH. All were managed surgically with complete recovery in 19 (90.47%) patients. The remaining 2 (9.52%) patients died post-operatively.

The overall frequency of seizure was only 5.02%(11out of 219).7 (63.64%)patients had GCS of 3-8,3 (27.27%) with GCS 9-12 and 1(9.09%) had GCS of 13-15.Amongst them all 10 patient with GCS less than 12 died, clearly suggesting seizure as the most important determinant in the mortality of patients with EDH. Pediatric patients and the elderly are less likely to die.

Highest mortality (28.57%) was in age group 31-40 years closely followed by 41-50 years (25%) and 21-30 years (21.42%). In the other groups it was less than 20%. However there were no death in the age group 0-10 years and 71-80 years as shown in figure 6.

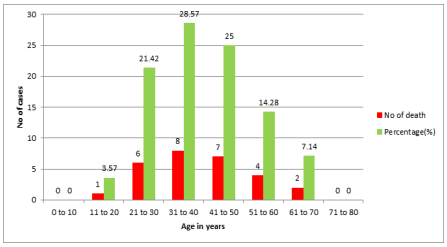

Figure 6: Distribution of mortality according to age group

DISCUSSION

Our study has similar demography profile when compared to other studies in the literature with few peculiarities. EDH represents 5.64% of all head injuries that we managed. This figure is slightly higher than the 1-3% reported in some other studies [10–12] although a study from Hong Kong had similar rate.[13] This may be due to late referral to our centre beyond the golden hour of operative intervention. In keeping with this, it has been reported that up to 9% of patients in coma have EDH requiring surgery. [14,15]

Road traffic accident (RTA) and fall from height are the predominant predisposing factors in our study, accounting for around 87% of patients. This reflects the serious impact of RTA in our society. Since these two factors are eminently preventable by proper enforcement of driving regulations and self-care, it may significantly reduce the overall incidence of head trauma. Studies in pediatric populations indicate a high incidence of falls [16] and this is also modifiable.

The preferred surgical intervention for EDH is craniotomy and evacuation of hematoma and we routinely do this surgery in all our patients. However Burr hole evacuation followed by drainage under negative pressure has been shown as a safe and effective method for emergency management of a pure acute traumatic epidural hematoma.[17] but none of our patients had undergone this. In such patients however, craniotomy should be performed if consciousness does not improve within several hours.[17] Conservative management has been advocated in patients in good clinical state, with small sized collections located in non-dangerous areas and when serial CT facility is available.[18] Some patients managed conservatively will subsequently deteriorate and require surgical intervention.[4] 153 patients in our series were managed conservatively initially but 5 (3.26%) of them had to have surgery. The decision to manage conservatively should be undertaken where close surveillance and prompt neurosurgical intervention is available.

The role of CT scan in early diagnosis, proper localization and volume of hematoma is important in planning of surgery as volume less than 30cc seldom requires surgery except in posterior fossa.

There is an established relationship between outcome of patients and the time lag between injury and surgical intervention.[9,19,20] Guidance from the Royal College of Surgeons of England recommends that surgical decompression should be carried out within 240 min (4 h) of the onset of significant symptoms in order to ensure good result.[6] This was not achievable in many of our patients as majority of them presented after this golden period.

About 9% (19) of our patients presented after the first week of injury which can be due to delayed onset EDH, which has an incidence of 10-20%.[4,21] However the frequency of this entity could not be determined with certainty in the present study as these patients did not had previous brain scans and were scanned only on presentation. In our experience, these patients have poorer outcome, which agrees with the finding by Korinth et al., that delayed EDH results in worse outcome [4].

There are many barriers to achieve the target time for optimal treatment of EDH. In a developing country with limited resources delay in diagnosis, delay in referral to a neurosurgical center, and the time taken to transfer the patient to the neurosurgical center are the most common factors resulting in a poor outcome.

Ninety nine (45.20%) of our patients came with GCS ≥13. Admission GCS is one of the most important predictors of eventual patient prognosis, outcome being better when the initial GCS is high [9,11] . In our study, no patient with GCS ≥13 died following hematoma evacuation. In contrast, 39.28% and 12.5% respectively of patients admitted with severe and moderate head injuries died.

Among the EDH cases that had seizures, 90% died. Sixty percent of all patients that died had seizure as a part of their presentation suggesting that seizures may be a poor prognostic factor in outcome of EDH. The seizures appeared late in the symptomatology of the patients that present with seizures and died. The influence of seizures on observed mortality in these patients may be explained by additional brain swelling on already critically raised intracranial pressure. Seizure prophylaxis should be considered in all patients with EDH who present late or with a GCS less than 8.

The overall mortality rate from this study was slightly high (12.78%) which is similar to some other studies.[9,22,23] This finding could largely be explained by delayed presentation to neurosurgical center. In patients presenting after 72 h mortality was significantly higher ($P < 0.001$) than in those presenting earlier. Among the patients that died, 67.86% had a GCS <8 at presentation. This emphasizes the high proportion of good outcome with prompt intervention in patients presenting with EDH compared with other types of severe head injury. Unlike most forms of TBI, people with EDH and a GCS as low as 3 may still have good outcome if they can receive surgery quickly.[13] Low GCS at presentation adversely affect outcome but should not be an absolute contraindication for surgery. Mortality rate in Pediatric patients and the elderly are less in this series.

CONCLUSION

Traumatic EDH is a life threatening condition, requiring immediate diagnosis and surgical intervention. Survival from traumatic EDH in our series was 87.12% and most of the survivors had a Glasgow Outcome Score of 4 or 5. Low GCS adversely affected outcome but should not be a contraindication for surgery. Early diagnosis by CT scan and immediate surgery would improve the outcome. Seizure was one of the most important determinant in mortality of EDH patients hence we advocate seizure prophylaxis in patients with EDH presenting with a GCS less than 8.

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