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CLINICO-RADIOLOGICAL FEATURES AND FACTORS AFFECTING SURGICAL MANAGEMENT AND OUTCOME OF TRAUMATIC EXTRADURAL HAEMATOMA

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ABSTRACT This study was carried out to find out the Age, Sex, Mode of injury, Localisation, Clinical presentation, NCCT Brain findings, Operative measures and Outcome of Extradural haematoma (EDH) in the patients presenting at IPGME&R and SSKM Hospital, Kolkata. 149 consecutive patients with cranial Extradural haematoma (EDH) who underwent surgical intervention in Department of Neurosurgery from September 2012 to September 2014 were included in this prospective study. Out of 149 patients 79.86% were Male and 20.14 were Females. Age ranged from less than 5 years to more than 50 years. Commonest age group was 16 to 35 years. Most common Mode of injury was Road traffic accidents (RTA) 63.08% followed by Headache/ Nausea and Vomiting 39.3%. In this present prospective study of 149 cases of Extradural haematoma (EDH), Frontal region was involved in 28.85% cases followed by Prietal region in 27.51% cases. 13 Patients (8.72%) were died. Extradural haematoma (EDH) is a neurosurgical emergency where early surgical intervention is associated with the best prognosis. Many factors affects the outcome of EDH surgery and the most important one is the time duration between incident/accident and operative intervention taken. Mortality can be closed to 0% if this time duration can be minimized.

KEYWORDS :

INTRODUCTION:

Head injury is one of the leading causes of death in the age group of 16-40 years. The epidural haematoma (EDH) is an extra axial collection of blood located in the potential space between the outer layer of dura mater and the inner table of the skull.[1] Most common etiology is traumatic, <1% of all patients with head injuries being affected but it can be as high as upto 10% in those who are comatose.[2] It is mostly an arterial bleeding from the middle meningeal artery, though other arteries such as the anterior meningeal artery or dural arteriovenous (AV) fistula at the vertex may be involved. But 10% of EDH can be due to venous bleeding.[3] A fracture of overlying bone is commonly associated.

Classically, the patients affected with EDH lose consciousness transiently and then regain it completely for a brief period (known as lucid interval) before rapidly deteriorating. But it should be noted that lucid interval is not pathognomic feature of EDH.

Imaging studies such as a CT scan comprise the mainstay of diagnosis. Laboratory studies such as PT-INR, activated partial thromboplastin time (aPTT), and liver function test (LFT) may be obtained to assess for increased bleeding risk or underlying coagulopathies.[4] The classic presentation is a biconvex or lens-shaped mass on brain CT scan (figure 1), due to the limited ability of blood to expand within the fixed attachment of the dura to the cranial sutures. CT scans also allow calculation of EDH volume and spotting continued bleeding (indicated by low density areas on CT, known as "swirl sign"). (figure 2)

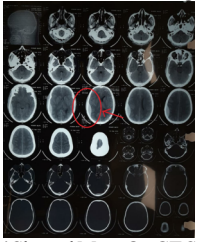

Figure 1 Depicting 'lens' Shaped Mass On CT Scan.

Figure 2: Depicting Swirl Sign On CT Scan.

EDH does not cross suture lines.[2] An MRI is recommended when there is suspicion of EDH in vertex or when CT is negative but there is high degree of clinical suspicion.

An EDH is considered a neurosurgical emergency and should be evaluated for surgical management as early as possible, ideally within 1-2 hrs of injury.

We analysed cases with EDH who underwent surgery over a period of 1 year from October 2018 to September 2019, to know the demographic picture of EDH, determine the independent influencing factors and surgical outcome and also to evaluate the current management strategy in dealing with EDH.

MATERIALS AND METHODS:

This is a retrospective analytical study done in a tertiary health care, referral centre in eastern India (IPGMER and SSKM Hospital, Kolkata).

During the study period, 252 patients admitted with isolated extradural hematomas in all age groups and both genders were included. Patients

with associated injuries like contusions, subdural hematomas, and traumatic subarachnoid hemorrhage were excluded.

Detailed epidemiological, clinical (including Glasgow Coma Scale) and diagnostic data was collected. The patients that underwent surgical management were observed for postoperative outcome (including Glasgow outcome score) for upto 3 months.

RESULTS:

All 252 patients were studied for various epidemiological factors. The number of male patients were 169, leading to male, female ratio of 2:1. The age wise incidence is depicted in table 1.

Table 1: Age Wise Incidence Of Extradural Haematoma In Our Study

Age (in years)	Number of patients	Male/Female (number of patients)
<10	18	10/8
11-20	30	18/12
21-30	48	34/14
31-40	73	51/22
41-50	41	26/15
51-60	27	19/8
>60	15	11/4

Mode of injury was also observed. The data thus collected is in table 2.

Table 2: Etiological Incidence Of Extradural Haematomas

Mode of Injury	Number of patients
Road traffic Accident	164
Falls	38
Assault	27
Sports related injury	23

The Glasgow Coma scale at the time of presentation was recorded for each patient (table 3).

Table 3: Glasgow Coma Scale Score Of Patients At The Time Of Presentation.

Glasgow Coma Scale	Number of patients
Mild (14-15)	152
Moderate (9-13)	67
Severe (<9)	33

On evaluating the presenting symptoms, it was found that headache was the most common (59.12%). Other common signs and symptoms were nausea/vomiting, altered sensorium, focal neurological deficit, bradycardia and pupillary changes. “Lucid interval” which was conventionally considered a classical sign of EDH was seen in 53 patients (20%).

The most common radiological site of haematoma was parietal (~27%). (table 4).

Table 4: Number Of Patients Presenting Different Location Of EDH

Site of EDH	Number of patients
Parietal	68
Frontal	51
Temporal	39
Temporo-parietal	37
Fronto-parietal	28
Parieto-occipital	12
Posterior fossa	9
Occipital	8

Of the 252 patients, 65 patients (~25%) were managed conservatively. For the rest, a craniotomy and evacuation of haematoma was done. The Glasgow outcome score was noted postoperatively. (table 5)

Table 5: Postoperative Glasgow Outcome Score (at one month) of patients

Glasgow Outcome Score (at one month)	Number of patients
Good recovery (5)	141
Moderate disability (4)	27
Severe disability (3)	8
Persistent vegetative state (2)	6
Dead (1)	5

DISCUSSION:

Amongst the patients of head injuries, EDH is incidental in 1-10% cases. This retrospective study highlights the epidemiological and clinic-radiological features of this neurosurgical emergency. It also provides introspective data on the management protocols and outcome thereof.

As evident in the literature [5,6], EDH affects the younger, more active age group. Our study agrees with this, the most commonly afflicted ages being 31-40 years. In elderly patients EDH is less frequent because of strong adhesion of dura to the skull, hampering the detachment and accumulation of blood. In children, as the osseous groove that houses the middle meningeal artery is not yet fully formed, injury of this artery is less frequent.[7] Since, it is most commonly a traumatic etiology, the ratio of male to female population affected is 2:1. The same was seen in many other studies like that of Karmacharya et al[2], Badhe U et al.[7] and Chowdhury et al. [8]

The most common mode of injury was road traffic accident as in other studies.[2,7,8] The percentages of mode of injury in our study was similar to the one by Rehman L et al.[9]

Most of the patients had GCS 14-15 (60.31%), demonstrating that the epidural hematoma was often a consequence of low impact trauma, with less chances of injury to brain parenchyma. It was also seen that GCS at presentation was a strong prognostic indicator.

The most common presenting symptom was headache (with or without nausea/vomiting) after injury. This is consistent with the results in study by Chowdhury et al.[8] Continued bleeding as denoted by swirl sign on CT scan (figure 2) was associated with poorer prognosis.[2]

The most common site of EDH in our study was parietal (27%), followed by frontal (20.23%), temporal (15.47%) and temporo-parietal (14.68%) in descending order. Other studies [2,8] and literature [10,11] assert that temporal or temporo-parietal is the most common site of EDH. Temporal and temporo-parietal EDH were associated with poorer outcomes due to proximity to brainstem structures.[7]

Patients with small haematomas can be managed conservatively and surgical treatment is indicated for patients with large extradural hematomas more than 30mls, midline shift more than 5mm or with reduced level of consciousness. [12]

In our study, nearly 25% patients could be managed conservatively. Like Dubey et al13, GCS, EDH volume and location of EDH were the main factors that influenced the management. But various other studies have concluded different factors as influential in the management route. Hamilton and Wallace et al.,[14] said patients with lower GCS score, pupillary abnormalities, larger EDH and greater midline underwent surgical management. According to Bejjani et al.,[15] mass effect, temporal location of blood clot, midline shift, thickness of clot and clot volume were independently related to surgery and other clinical factors such as age, GCS were not associated. But according to Servadei et al.,[16] only thickness of hematoma and midline shift were related to decide to operate out of all factors they analyzed.

The postoperative outcome was measured by Glasgow outcome score. 75% patients that underwent surgery had a good Glasgow outcome score at one month follow up. This increased to 82% at three month follow up. Such high rates of favourable post-operative outcome is consistent with other studies like Karmacharya et al., Badhe et al., Chowdhury et al. and Roka et al. [2,7,8,17]

Various factors that influenced poorer post-operative outcome were delay in receiving medical care, low GCS at the time of presentation, greater clot volume (>30ml) and temporal/ temporoparietal site of haematoma. This was also seen in study by Badhe et al. and Sarvadei et al.[7,16]

CONCLUSION:

EDH is mostly traumatic (due to RTAs) and commonly affects young (31-40 years), males. Most common presenting symptom like headache can be deceiving and a high degree of suspicion is required. CT scans are not only diagnostic but also useful in delineating site, volume of haematoma and presence or absence of continuous

bleeding; making it an incredible tool to guide management. Even though EDH is fatal, early diagnosis and treatment leads to higher rates of favourable outcome.

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