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Prognostic Factors in Operated Cases of Extra Dural Haematoma: Our Institutional Experience

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ABSTRACT

Traumatic extra dural hematomas (EDH) comprise 10-12% of all head trauma admissions. Despite the knowledge that outcome from surgical decompression and repair is related directly to patients' preoperative neurological condition, there is no specific trauma and epidemiologic prognostic factors related that can contribute to the patient's follow-up analysis and very few Indian studies are available on the same. We did a retrospective analysis in our institute of 82 cases of EDH to determine the prognostic factors in operated cases of EDH. Data was collected from the patient records using a standardized structured questionnaire. The data variables collected included gender, age, GCS on admission, time lapse between injury and surgery, midline shift, amount of EDH bleed. Numerical results were presented in means and standard deviation, median and at the 25th and 75th percentile and Values of $p<0.05$ were considered significant. In 82 cases, 56 were male, 26 were female. The mean age of presentation was 34. Most common etiology was RTA (76.8), assault (14.6%) and falls (6.5%). GCS on admission was 13-15 in 28%, 9-12 52%, <8 IN 19.5%. Average time to surgical intervention was 3 hours. Size of EDH was 30-50 ml in 18%, 50-80 ml in 58.5% and >80 ml in 23% cases. 86% of cases had good outcome, 9 % had some residual deficit and 5% mortality noted. Extra-dural hematoma is one of the most injury seen after head injury. Timely surgical intervention can be lifesaving. The prognosis depend upon age of patient, GCS on presentation, size of EDH, time lag between trauma and surgical management and associated severity of other injuries.

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Key Words
Extra dural haematoma, prognostic factors, traumatic brain injury

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INTRODUCTION

Head injury is a leading cause of mortality and morbidity in developing as well as developed countries. Traumatic brain injury (TBI) accounts for approximately 60% of these traumatic deaths and most of the persisting disabilities in accident survivors. Traumatic extra dural hematomas (EDH) comprise 10-12% of all head trauma admissions[1]. Extra dural hematoma (EDH) is hemorrhage between the inner table of the skull and the dura matter and is a neuro surgical emergency and in these case timely surgical intervention can change the outcome in patients. Studies show that mortality may range from 41% in patients with a Glasgow coma scale (GCS) score of 8 or less, to zero in patients who are alert at the time of the operation[2]. The classic clinical presentation is loss of consciousness immediately after the trauma, followed by a lucid interval in which there is recovery of the level of consciousness during some hours and a later deterioration, with clinical features like seizure, hemiparesis, unequal pupils. The treatment of EDH is usually surgical management but few cases can be managed conservatively[3] Patients who meet all the following criteria may be treated conservatively, provided there is rigid clinical follow-up and control imaging: hematoma volume <30mL, thickness <15mm, midline deviation <5 mm, GCS greater than 8 and no focal neurological deficit[4]. EDH with a volume greater than 30 mL should be evacuated regardless of patient's GCS. The expeditious surgical evacuation of EDHs in such cases will provide with the best prognosis with minimal deficit especially because the underlying brain has usually been minimally injured[5]. However, despite the knowledge that outcome from surgical decompression and repair is related directly to patients' preoperative neurological condition, there is no specific trauma and epidemiologic prognostic factors related that can contribute to the patient's follow-up analysis and very few Indian studies are available on the same. The aim of this study was to define prognostic factors which can contribute significantly to management of EDH cases and expand available database regarding the same.

MATERIALS AND METHODS

This is a retrospective study done at BJGMC and SGH, Pune hospital between December 2023- December 2024. Total 82 cases of EDH have been taken in study. Data was collected from the patient records using a standardized structured questionnaire. The data variables collected included gender, age, GCS on admission, pupil abnormalities, accompanying injuries, loss of consciousness, focal limb weakness, sensory loss. Pre-morbid risk factors, surgical variables such as type of surgery and time elapsed from accident to surgery (time to diagnosis and time to surgery) and size of EDH, presence of herniating were noted. Also outcome at discharge were also documented. All patients underwent detailed clinical and neurological examination, laboratory investigations and brain imaging (Computed Tomography-CT-scan) to assess the EDH. Surgical techniques used was standard decompressive craniotomy with evacuation of EDH. Numerical results were presented in means and standard deviation, median and at the 25th and 75th percentile, minimal and maximal values. The categorical results were presented in absolute and relative frequency. Values of $p<0.05$ were considered significant.

RESULTS AND DISCUSSIONS

Total 82 patients were included in study. Male 56, Female 26.

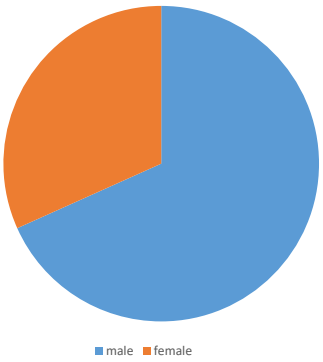

Fig. 1: Gender Distribution

Table 1: Gender Distribution

Gender	
Male	56
Female	26
Age	
<20 yrs	22 (26.8%)
20-50 yrs	32 (39%)
>50 yrs	18 (21.9%)
Cause	
RTA	63 (76.8%)
Assault	12 (14.6%)
Fall	7 (8.5%)
GCS on presentation	
13-15	23 (28%)
9-12	43 (52.4%)
<8	16 (19.5%)
Herniation	
Present	35 (42.68%)
Absent	47 (57.31%)
Time of intervention	
2-5 hrs	18 (21.9%)
5-10 hrs	41 (50%)
>10 hrs	23 (28%)
Midline shift	
5-8mm	23 (28%)
8-10mm	44 (53.6%)
>10mm	15 (18.2%)
Size of EDH	
30-50mL	15 (18.2%)
50-80mL	48 (58.5%)
>80mL	19 (23.1%)

The range of age was from 1 year-80 years. Mean age was 34 years of age. Number of patients younger than 20 years was 22. Between 21-50 years was 33 and above 50 years was 27. The most common cause was road traffic accident 63 case(76.8%), assault 12cases(14.6%) and fall 7 cases (8.5%).

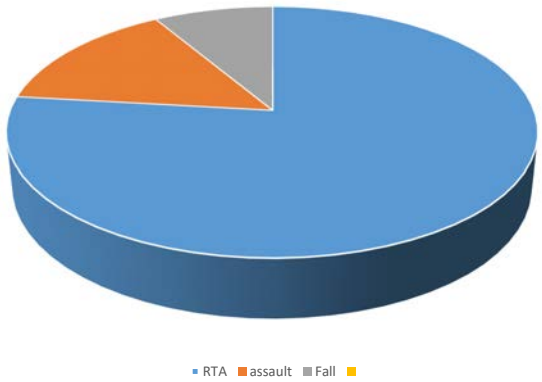

Fig. 2: Etiology

GCS on admission was assessed in casualty on admission as well as post-surgery. Most case had mild deterioration of GCS. On basis of GCS the patients were categorised as following: GCS 13-15 , GCS 9-12, GCS < 8. In our study GCS was 13- 15 in 23 cases (28%), 9-12 in 43 (52.4%), <8 in 16 cases(19.5).

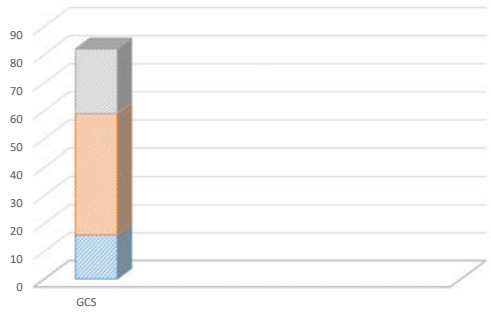

Fig. 3: GCS on Admission

The most common presenting symptom was loss of consciousness (66.5%). The classically described lucid interval was recorded for only 30.8% of the patients. Other common symptoms included headaches (32.6%) and nausea (29.5%). Additional neurological symptoms that were encountered were confusion (27.7%), focal limb weakness (26.8%), convulsions (14.7%), memory loss (6.7%), visual disturbances (5%) and sensory deficits (0.4%). Herniating were seen in 35 cases out of 82. The time of surgical intervention from the time of brain injury was divided in 3 categories. First were time window was within 2-5 hours in which there were 18 cases (21.9%), second category was time window between 5-10 hours with 41 cases (50%), rest >10 hours 23 cases (28%). According to midline shift, we divided cases in those having midline between 5-8 mm and those with midline shift 8-10 mm, >10 mm shift. 5-8 mm shift was seen in 23 cases (28%) and 8-10 mm shift in 44 cases (53.6%) and >10 mm shift in 15 cases (18.2%). The size of EDH 30-50ml in 15 cases (18%), 50 -80ml EDH in 48 cases(58.5%) and >80 ml seen in 19 cases (23%). Eighty six percent of the patients had a good functional recovery whereas 5.2% had mild residual disabilities. While 5% mortality. In our series, most patients were evacuated within 24 hours. They had a functional recovery rate of 90% and no residual disabilities. Those referred late, having age >50 years, EDH >80 ml and severe associated injuries had higher chances of morbidities and residual disabilities 4%.

Extra dural hematoma occurs most frequently secondarily to laceration of meningeal vessels, diploic veins or dural sinuses in traumatic head injuries with skull fractures. Blood overflows into the epidural space between the inner tabula of the skull and periosteal layer of dura mater. The dura mater is pulled away by the hematoma resulting in the biconvex shape of EDH[7]. EDHcan be caused by arteries or veins. Most arterial EDH occurs in the temporoparietal region, the location in which the middle meningeal artery is especially vulnerable, due to the close anatomic relation, thinness of temporal scales and greater exposure to external traumas. Venous EDH is much less common and usually comes from laceration of dural venous sinus, or injury to meningeal or diploic veins. Which explains why the venous EDH are near the dural sinuses[8]. In a study conducted by Ibanez J. *et al,* the proportion between male and female patients is around 4:1[9]. We observed in our study population that EDH was most frequently in male young adult patients, between the first and third decades of life. In our study, the male to female ratio was 5:1. In this age distribution, patients with active life are more frequently exposed to risk situations, such as motorcycle traffic accidents without wearing a helmet, driving without a seat belt and thus being more vulnerable to TBI. Patients with mild TBI had a good outcome and a sooner average hospital discharge than those with severe TBI, who presented a worse outcome and therefore remained hospitalized for longer periods. A study conducted by Cheung[10] reported 100% mortality in a series of acute EDH patients with myristic pupils for >70 minutes (15). It has been widely documented that the timing of surgery is of prognostic significance in severely injured EDH patients. While the cases who had mortality in our study (5%) were also either referred late or had poor GCS on admission and herniation with fixed dilated pupils, co relating with this study. Haselsberger[11] documented a mean time elapsed of 2 hours, whereas Taussky *et al.* reported a mean time of 3 hours. While mean time to surgery in our study was 3 hours which was similar to study by Taussky. The results of this study demonstrated that a good functional recovery was achieved by 86% with residual disability in only 9%

of the patients in our series. This concurs with previous study by Taussky[6] which reported good functional recovery of 81.5%[6].

CONCLUSION

Extra-dural hematoma is one of the most injury seen after head injury. Timely surgical intervention can be lifesaving. The prognosis depend upon age of patient, GCS on presentation, size of EDH, time lag between trauma and surgical management and associated severity of other injuries. Our study adds to be current data on these prognostic factors.

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