Original Article

Neurosurgical Outcome of Aute Traumatic EDH. Based on GCS

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Abstract

Objective: Assessment of Neurosurgical Outcome of Acute Traumatic Extramural Hematoma based on GCS. **Study Design**: Clinical Trial. **Place and Duration**: Neurosurgery Department Allied Hospital Faisalabad, 20 Months from July 31-2011 to 28-2-2013. **Clinical Material and Method:** One hundred and thirty patients were selected for study. CT scan brain was done of every patient. The size of EDH was assessed. GCS was assessed. Patients were grouped in three groups A (GCS >8, EDH volume <30 ml), B (GCS <8, EDH volume > 30 ml) and C (GCS > 8, EDH volume > 30 ml). Outcome was assessed according to Glasgow outcome scale. **Conclusion:** Patients with group A (EDH < 30ml and GCS > 8) can be managed conservatively. Their outcome was comparable with operated patients EDH > 30ml. However group B has mortality of 4.3% and outcome was different from group A & C which have no mortality. **Keywords:** EDH, Outcome, Mortality, Volume of EDH.

INTRODUCTION

Traumatic bran injury (TBI) is a leading cause of morbidity and mortality in modern world [1]. It converts healthy and useful citizens to dependent, disabled persons or dead ones[2].It results in considerable health care cost and, in many survivors, permanent disability [3]. In developing countries, the incidence of traumatic brain injury is increasing as traffic increases, besides other confounding factors such as industrialization, falls and ballistic trauma [4,5]. EDH is a part of head injury. If untreated, it may lead to severe disability and death. It is collection of blood between skull and dura, mostly due to rupture of vessel, the most common being middle meningeal artery or rupture of venous sinous. The frequency of EDH ranges from 2 to 15 % in head injury patients in various studies [6,7,8,9]. Cheung et al has found its incidence as 1.5 cases per 100,000 persons per years [10]. There is male preponderance with male to female ratio 3.5 to 1 [11,12]. The majority of patients were found to be in the third, fourth and second decades of life. This age group is the most active and productive group of society and are more likely to be exposed to both occupational and social risks.

Clinically patient may worsen within minutes to hours from fully conscious to moribund state. On examination, patient has varied conscious level, dilated fixed pupil and hemiparesis. The condition may lead to permanent damage or death within hours. CT Scan Brain has facilitated a comprehensive diagnosis and permits early targeted intervention[11]. The site of EDH may be temporal, frontal, parietal, occipital area. Posterior fossa EDH account for 10% of all EDHs [13].The

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presence of small EDH in a patient who is neurologically intact or in elderly moribund patient, a decision may be made to treat as conservatively [14]. A small EDH (10-55ml) can be observed and safely managed conservatively [15]. A significant EDH needs early diagnosis, early surgical evacuation and postoperative ICU monitoring. Patients with good preoperative GCS grade, have better outcome, depicting less secondary brain injury. Early mortality of 86% in patients with EDH [16], this been reduced to 5 to 12% by early diagnosis by CT Scan, rapid management and post operative care ICU [12].

Many studies have shown that the neurological condition of patient , the size of EDH, the degree of midline shift and presence or absence of pressure effect on basal cistern – are the most commonly employed criteria for making a decision between surgical or conservative management. [17]. To minimize the deleterious effects of head injury, general safety rules like wearing helmets, use of air balloons in vehicles, use of seat belts, enforcement of speed limit, safety sports rules, not diving in water if depth is not known and work place safety measures must be used. When head injury has occurred, pre hospital intervention such as maintaining patients airway ensuring adequate oxygenation, coupled with reversing of hypotension with fluids, substantially obviates morbidity and mortality[18]

METHODOLOGY

It was a clinical trial study consisting of 130 consecutive patients, received in emergency department from July 31, 2011 to February 28, 2013 (20 months). All patients have isolated acute traumatic EDH. Regardless of age (2–60 years) or gender, the patients were divided in three groups

Group-A

GCS: 9–15 (Volume $\leq$ 30cm 3) 70 patients conservatively managed.

Group-B

GCS $\leq$ 8 (volume > 30cm3) 46 patients operated

Group-C

GCS $>$ 8 (volume >30cm3) 14 patients operated

All patients with EDH with associated brain injury were excluded. Posterior fossa EDH or patients with systemic injuries were not included.

For data collection, permission was taken from Hospital Ethical Committee. Consent was taken from patients or attendants of patient. CT Scan of patient was done. Size of hematoma was calculated by formula 0.5 x width x AP diameter. Patients were assigned group A, B and C depending upon criteria of selection of patients.

Group A (70) was managed conservatively. Groups B & C (60) were offered surgery. Consent was taken. All the risk and benefits of surgery were explained.

Groups B & C underwent craniotomy or craniectomy depending upon the need, under general anesthesia. Preoperative antibiotic was given. Postoperatively patients were kept in ICU.

Group A was monitored and repeated CT Scans were done when needed. Data regarding mortality was taken and analyzed on SPSS version 10. Descriptive statistics were calculated. Mean Standard Deviation was calculated for quantitative variables like age and GCS. Neurosurgical outcome was presented as frequency and percentage calculated.

Chi-square was used in outcome in three groups .P value < 0.05 was considered significance.

RESULTS

One hundred and thirty consecutive patients (111 male –19 female –) with EDH were selected over 20 months. The mean age range was 2–60 years (25.95 $\pm$ 13.32years).Sixty patents underwent craniotomy or craniectomy and rest (70) were managed conservatively. Overall favorable outcome was in 95.7%. Only 6 patients (4.3%) expired. The GCS of patients at admission ranged from 4–15. The outcome of patients was compared in three groups. Unfavorable outcome was found in patients group B (GCS<= 8) with EDH more than $30cm^3$ and six patients expired whereas no patient expired in group A with EDH

$\leq 30cm^3$. No patient expired in group C with GCS more than 8 and EDH more then .There was significant statistical difference between group A & B ($P<0.05$), There was no statistical difference between A & C in results.

Table-1

Grouping and Outcome

Group	No of patient	Mortality
A	70	0
B	46	6(4.3 %)
C	14	0

DISCUSSION

The study shows that the GCS of patients and volume of EDH are the important factors which affect the outcome in head injury patients with acute traumatic EDH. Lobito [19] et al, Lee et al [20] & Servadei [21] et al have also shown in their studies that volume of EDH and GCS of the patients have clinical significance in the outcome of the patients. There is male preponderance (111 male / 19 female) in our study. The mean age of patient was 25.95 years ($\pm$13.32) (2 – 60 years). According to Cheung et al, there was male preponderance (78.7% male, 21.3% female) in head injury patients [22].Many other studies have shown similar pattern [6,12]. In an other study, patients with age range 2 – 83 years, higher number of victims were in third decade of life (n = 180 , 29.5%) [22,23]. It was followed by 2nd decade of life. Only 34 patients (4.92%) were above the age of 50 [22,23],. The male preponderance may be due to fact that they are exposed more to day to day activity and old people including females, are less exposed to trauma due to adherent means of living.

We have found that patients of EDH volume $\leq 30cm^3$ can be managed conservatively. Bezircioglu et al has also advocated that EDH with volume <30ml can be managed conservatively except when EDH is temporal, CT Scan brain has heterogeneous appearance of EDH and CT Scan performed within 6 hours [21]. Chen et al also reported that EDH volume > 30ml, thickness > 15ml, midline shift more than 5mm require surgery [24]. Bullock et al managed conservatively 12 patients with EDH from 12 to 38ml conservatively. All patients were conscious, with midline shift < 5mm without effacement of basal cisterns[25]. Bejjani et al have demonstrated that the most important radiographic parameter dictating surgical evacuation was maximum diameter of hematoma more than 18mm. On the other hand, small EDH with thickness less than 1 cm and AP diameter less than 3cm with no midline shift on CT Scan in an asymptomatic patient may favour conservative management[26]. Offner et al has suggested that if a small EDH was present in neurologically intact patient or in an elderly moribund patient a decision may be made to manage the patient conservatively[14].

We have not analyzed the conservative management of posterior fossa EDH due to inadequate sample. It appears that adoption of appropriate criteria to select patients for conservative or surgical management can avoid unnecessary surgical risk. Repeat CT Scan and assessment of GCS before surgery are important predictor of outcomes in patients undergoing surgery [10,23]. In our study mortality was 4.3%.

CONCLUSION

EDH affected mainly young male adults. EDH is Neurosurgical Emergency. Patients with good GCS at admission and EDH volume < 30cm3 can be managed conservatively and patients with EDH > 30cm3 must be operated. The results of conservative group (EDH < 30ml GCS > 8) are similar to those operated in good grade GCS > 8 & EDH > 30ml.

Public safety measures including traffic laws should be observed to prevent morbidity and mortality. Emergency services should be enhanced to cater for rapid management of EDH – a preventable cause of death which converts a useful citizen to disabled or dead one.

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