ORIGINAL ARTICLE

Burr Hole Evacuation of Extradural Hematoma in Mass Trauma, a Life Saving and Time Saving Procedure: Our Experience in Earth Quake of Oct 8th, 2005

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ABSTRACT

Background: *Traumatic brain injury represents a significant cause of mortality and permanent disability in the adult population. Extradural hematoma is one of the conditions most strongly associated with severe brain injury. Knowledge on the natural history of the illness and the outcomes of patients surgically managed may help the neurosurgeon in the decision-making process.*

Objective: *To observe the outcome of burr hole evacuation of extradural hematoma in mass head injury.*

Methods: *This study included patients of any age who sustained head injury in the earth quake of October 8th, 2005. Who has been diagnosed as a case of extradural hematoma on CT-Scan and has been admitted in the neurosurgery ward presenting over a period of 3 days (8th October 2005 to12th October 2005). Patients with any other associated intracranial abnormalities, such as cerebral contusions, as shown on CT, were excluded from this study. All patients were followed by serial CT scanning, and neurological assessments.*

Results: *A total of 36 patients were included in this study. There were 25 male and 11 female patients with age ranges from 5 years to 50 years. All cases were the victim of earth quake. All patients underwent surgery for evacuation of extradural hematoma through a single burr hole. 1 patient required craniotomy for extradural hematoma due to neurological deterioration on the second postoperative day, and 1 patient died.*

Conclusion: *From this study we concluded that as extradural hematoma is potentially fatal lesion, so in mass head injured patients like in earth quakes, evacuation of extradural hematoma through a single burr hole has good outcome with less chances of recurrence and complications.*

Key Words*: Extradural hematoma, burr hole evacuation, and mass injured patients.*

INTRODUCTION

Head Injury is becoming major a health problem and it has been reported that 1% of all deaths and 15% of deaths occurring in the 15 – 24 years of age group are due to head injury.[1] The major cause of preventable deaths is a delay in diagnosing and treating intra cranial hematomas.[2] Deterioration of conscious level and developing focal signs like ipsilateral pupil dilatation and contra lateral hemiplegia, and up going planters signify a rapidly expanding EDH. An urgent CT scan in such cases will reveal biconvex hyper dense, extra dural lesion causing effacement of ventricle and mid-line shift. Craniotomy and evacuation of hematoma is the only way to save the life of these patients from a potentially fatal benign lesion.

The present study was carried out on patients of extra dural hematoma, with a view to define the outcome of extradural hematoma evacuated through a single burr hole.

MATERIAL AND METHODS

This descriptive study was conducted in the department of neurosurgery, ATH, Abottabad from 8th October to 12 October 2005, during the earth quake. Ayub Teaching Hospital is 1000 bedded hospital with well established unit and serving about 7 million population. We had two qualified neurosurgeons at that time and the number of injured were in lakhs.

In which on first day of earth quake 18 patients were operated for extradural hematoma, on second day 13 patients and on third day 6 patients were operated. The total number of patients was 36.

All patients with traumatic extradural hematoma of any gender were included. The usual delay in reaching the hospital was primarily due to two reasons: The formidably long distances the patients had to travel on one hand, and the poor means of transport available on the other. However, factors like a delayed referral from peripheral hospitals, illiteracy on one part of the patients and general practitioners, etc also played a part in some cases.

A detailed history was obtained and a thorough clinical examination was carried out in every patient. A Special effort was made to ascertain the mode of injury, the exact time and place of injury, the details of the initial management at peripheral hospitals, the means of transport used to reach ATH, Abottabad and the details of the behaviour of the patient's conscious level from time of injury to admission in our hospital. In the hospital, the classical signs of extradural hematoma like deterioration in conscious level, pupil difference and hemiparesis were especially checked during the period of observation. A record of the vital signs and the Glasgow Coma Score was maintained at thirty – minute intervals.

X-rays of the skull and CT scan were done in all cases. The volume of EDH was calculated using the Peterson and Epperson equation a x b x c x 0.5, where a, b, and c represent diameter of the hematoma in the sagittal, axial and coronal planes respectively. When a diagnosis of EDH was established, the patient was shifted to the theatre for surgical evacuation of the hematoma through a single burr hole. During the post-operative period, the clinical observation of the classical signs, the vital signs and the Glasgow Coma Score were maintained till the time of discharge. At the time of discharge, the morbidity in terms of neurological deficit was recorded. All patients were followed up for six months.

RESULTS

There were 36 patients of extradural hematoma, managed surgically at ATH during the three days period.

Sex Incidence

There were 25 (69.4%) males and 11 (30.6%) were female patients.

Table 1: *Sex Incidence.*

Sex	No.	Percentage
Male	25	69.4%
Female	11	30.6%
Total	36	

Age Incidence

The greatest representation was found in the 21 to 30 years age groups with17 patients (47.2%), followed by the 11 to 20 years with 7 patients (19.4%), the 31 to 40 years age groups with 4 patients (11.1%), the 41 to 50 years age groups with 3 patients (8.3%) and patients with age less than 10 years were 5 (13.8%).

Table 2: *Age wise representation of extradural hematoma, n= 36.*

Age Range	No. of Patients	Percentage
5 – 10 years	5	13.8%
11 – 20 years	7	19.4%
21 – 30 years	17	47.2%
31 – 40 years	4	11.1%
41 – 50 years	3	8.3%

Clinical Features

Ipsilateral pupil dilatation was a very important clinical sign. In this series, a difference in the pupil size was noted in 18 (50%) cases. In the remaining 18 (50%) patients, the pupils were equal and reacting to light at the time of admission. A relative hemiparesis of varying degrees was observed in 8 (22.2%) patients. In addition to the above mentioned signs, patients of extradural hematomas presented with other signs as

well. Vomiting was the commonest finding and was present in 76% of the patients. A bleeding from the ear, nose and mouth was observed in 11%. Fits were seen in 9%. Headache as the sole presenting complaint was seen in 13%.

Table 3: *Outcome of burr hole evacuation of extradural hematoma, n = 36.*

Outcome	No. of Patients	Percentage
Recovered	34	94.4%
Re operated	1	2.7%
Dead	1	2.7%

DISCUSSION

Extradural haematoma is accumulation of blood between the inner table of skull and the stripped off dural membrane,[3,4] Extradural hematoma mostly located in the temporoparietal region in approximately 70 – 80% of patients with extension to adjacent frontal and occipital areas is common.[5] Extradural hematoma occurs in 1 – 2% of head injured patients.[6] Adults suffer head injuries most frequently due to falls, motor vehicle crashes (82%),[7] colliding or being struck by an object (40%),[8] and assaults.

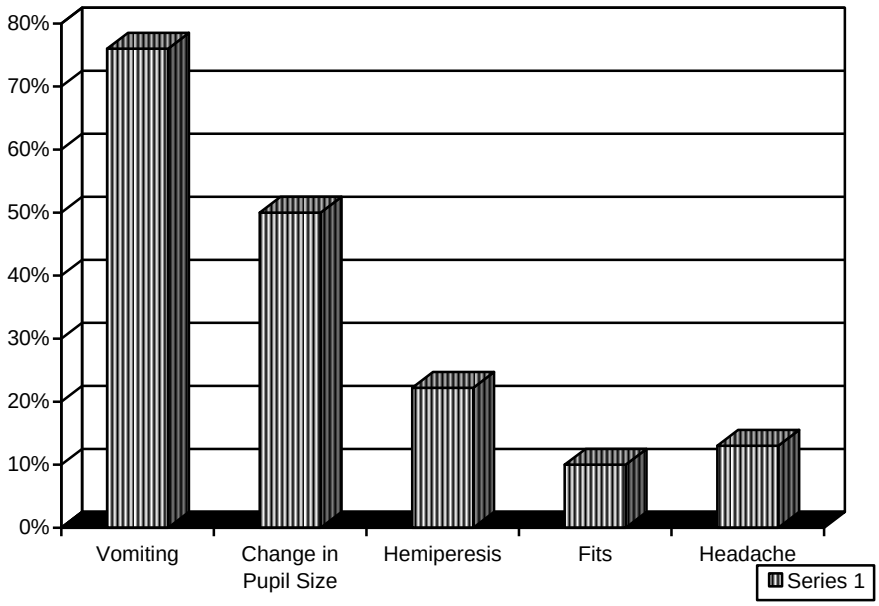

Fig. 1: *Percentage of Clinical Findings in Patients with Extradural Haematoma, n = 36.*

Among the hematomas, extradural hematomas assume the greatest importance as they can be diagnosed and treated easily. Extradural hematoma results from blunt trauma to the skull and meninges. Pathophysiology is this that the initial impact of force causes deformation or fracturing of cranium produces detachment of the dura directly beneath the site of blow and injures the blood vessels, followed by filling the extradural space with blood. Several studies indicates that this bleeding in the resulting pockets creates a hydraulic "water pressure" effect, progressively strip-ping the dura away from skull and thus increasing the size of extradural hematoma.[9,10]

In patients with head injury X-ray skull is a good tool for assessment,[11] as Incidence of skull fracture in patients operated for extradural hematoma in various series has been reported between 63 – 85%.[12-15]

Important prognostic factor is level of consciousness which deteriorates with delay in surgery[16] which results due to a delay in diagnosis and referral,[17] so X-rays are readily available for diagnosis of skull fracture, which may guide for early referral to a neurosurgical facility.

CT scan was found to be an extremely useful diagnostic tool. Which shows hyperdence biconvex shadow of extradural hematoma. It helped us to diagnose extradural hematoma in all 36 patients. A few older studies show the role of angiography in diagnosing EDH.[18,19] But with the invention and implementation of CT scan it has become the investigation of choice to diagnose the volume and location of EDH, associated injuries and midline shift etc. The mortality rate of 29 to 33% in pre CT scan era and 9 to 12% in post CT Scan era have been reported.[18,19] Its availability round the clock is a great asset. Persistent headache and vomiting are also indications for a CT scan. In the present series 5 (13%) patients presented with intractable headache after trauma as the sole complaint. In the series by Cook et al 20, 40% of patients presented with only headache and Vomiting.

Blood clot evacuation through craniotomy is the accepted method for treatment of a pure traumatic extradural hematoma following closed head injury, but

in certain emergency situations where you are short of time, equipments and qualified neurosurgeons to deal with the situation then use of craniotomy for evacuation of blood clot may not be feasible. In such situations placement of a burr hole and drainage under negative pressure constitutes a rapid, life saving and safe approach to manage patients with simple extradural hematoma,[21] or skull trephination in emergency room before referring the patient to proper neurosurgical centre[22].

In earth quake of October 2005, we were short of qualified neurosurgeons, instruments, and time. Instruments were sterilized by simple dipping in savlon. So all patients underwent simple burr hole evacuation of extradural hematoma, burr hole was done at the maximum thickness of the hematoma, main bulk of hematoma was removed with the help of suction and spatula, hemostasis secured and wound closed. Operating time from opening to closure of wound was 30 minutes in maximum cases.

Post operative CT scan was done in all patients for consecutively 3 days. In which 34 (94.4%) showed resolvent of hematoma, 1 (2.7%) patients showed increased in hematoma on the first operative day for which decompressive craniotomy was done, and 1 (2.7%) patients died on the same operative day.

CONCLUSION

From this study we concluded that in such situations like earth quakes, where a mass of head injured patients present to you and you are short of equipments and time, even the outcome of extradural hematoma evacuated through a single burr hole is good and life saving with less chances of complications and recurrence. To ensure the safety of patients regarding this procedure, monitoring should be done by daily CT scans and decompressive craniotomy should be performed if consciousness doesn't improved within several hours of the procedure.

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