

# ACUTE EXTRA DURAL HAEMATOMA: FACTORS AFFECTING THE OUTCOME

Shahid Ayub, Mumtaz Ali, Mohammad Ilyas

Department of Neurosurgery,  
Postgraduate Medical Institute, Hayatabad Medical Complex Peshawar.

## ABSTRACT

**Objective:** The objective of the present study was to determine the factors that affect the outcome in the management of acute extradural haematoma.

**Material and Methods:** The study was carried out at the Department of Neurosurgery, PGMI Hayatabad Medical Complex Peshawar, from 1st January 2000 to 31st December 2001. The clinical record of patients who were operated for acute extradural haematoma in the Neurosurgical Unit was reviewed. Their clinical condition, Glasgow coma score (GCS), duration and mode of trauma at the time of presentation were noted. The CT Scan findings, and the surgical procedure done, were analyzed. The postoperative outcome was assessed on the basis of Glasgow coma score.

**Results:** In this study 108 patients operated for acute extradural haematoma were selected. The ages ranged from 8 months to 65 years with male to female ratio of 5:1. Out of these patients, 26 (24%) were less than 15 years, 38 (35.1%) were between 16 and 30 years, 32 (29.6%) between 31 and 45 years. A satisfactory out come was achieved in 74 (69 %) cases that presented within 12 hours as compared to those who presented late. Patient's age less than 45 years had better outcome as compared to those with more than 45 years of age. Mortality rate was 8% (n=7).

**Conclusion:** Timely surgery in patients who are in younger age group has better out come. The size of the haematoma and mode of trauma are also important factors that affect the outcome.

**Key words:** Acute Extradural Haematoma, Head injury, Morbidity, Mortality.

## INTRODUCTION

Traumatic brain injury is one of the frequent causes for hospitalization. Overall head injuries lead to 10 deaths per 100,000 populations in these cases<sup>1,2</sup>. Apart from primary brain damage at the time of impact, there are number of secondary damages that affect the ultimate outcome in these cases. Acute extradural haematoma is one of the known secondary complications of head injuries. It is characterized by bleeding between the skull and the dura. It accounts for 2-3 % of all head injuries<sup>3,4</sup>.

The mortality of patients operated for extradural haematoma varies from 12% to 42% in different series<sup>5</sup>. There is rapid deterioration in the conscious level in case of expanding extradural haematoma. To prevent these sequelae immediate evacuation of the haematoma is necessary. Many factors have been found to affect the postoperative outcome, such as delay in treatment due to late arrival and delayed diagnosis, neurological status (GCS) at arrival and bilateral haematomas<sup>6</sup>. Mode of trauma, age of the patients, size of the

haematoma and the duration of postoperative coma also affect the outcome<sup>7</sup>.

In the present study, the influence of these factors on the final outcome of the patients was determined, and attempt was made to delineate the factors conducive to decreasing mortality.

## MATERIAL AND METHODS

This study was conducted in neurosurgery unit Postgraduate Medical Institute, Hayatabad Medical Complex Peshawar. One hundred and eight patients were consecutively treated in this series. They represented 6.2 % of all head injuries admitted during the period of study. Sixty-five (60%) of the patients were directly admitted through the casualty department, while 43 (40 %) were referred from the peripheral hospitals. Some of the patients were received from Afghanistan. All patients had their X rays done in casualty, two patients had their CT Scan done at other centers, rest of the patients had their CT Scans in the main recipient hospital. At admission a detailed clinical history was taken. Neurological findings and GCS were documented.

All patients were operated. Craniotomy was done in 90 (83.3%) patients, while craniectomy was done in 18 (16.7%) cases due to associated fracture of the cranial bone. All patients were kept in Neurosurgical ICU for first 24 hours. Postoperatively the brain swelling was treated with Mannitol. In 15 (13.8%) patients tracheostomy was performed immediately after surgery and in 4 cases on 2<sup>nd</sup> to 5<sup>th</sup> postoperative day due to respiratory problems. None of the patients was reexplored.

The final outcome was graded on the basis of Glasgow coma score at the time of discharge, as mild (GCS 13-15), moderate (GCS 9-12), severe (GCS 8 & below) coma state and death.

**RESULTS**

The patient's age ranged from 8 months to 65 years. There were 90 (83.3%) male and 18 (16.7%) female patients (5:1). Out of these patients 26 (24%) were less than 15 years of age, 38 (35.1%) were between 16 and 30 years of age, and 32 (29.6%) were between 31 and 45 years of age, while 12 (11.1%) patients were more than 45 years (Table 1).

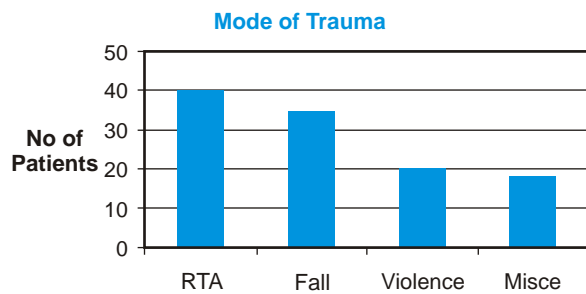


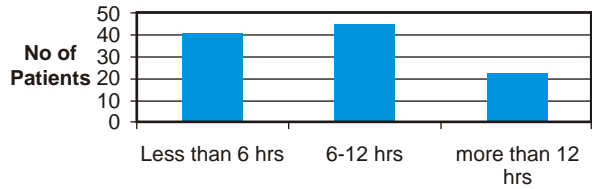
Figure 1

**GCS OF PATIENTS BEFORE AND AFTER SURGERY IN DIFFERENT AGE GROUPS**

Age Range	Patients	GCS Before Surgery		GCS After Surgery	
		13-15	09-12	13-15	09-12
Less than 15 years	26	13-15	09	13-15	17
		09-12	11	09-12	07
		8 & below	06	8 & below	02
16-30 years	38	13-15	14	13-15	29
		09-12	17	09-12	06
		8 & below	07	8 & below	03
31-45 years	32	13-15	15	13-15	20
		09-12	14	09-12	10
		8 & below	03	8 & below	02
46-65 years	12	13-15	07	13-15	08
		09-12	04	09-12	03
		8 & below	01	8 & below	01

Table 1

Figure 2



Time interval between trauma & surgery

The majority of patients, 40 (37.03%) were victims of road traffic accident, 35 (32.4%) had fall from height, 20 (18.5%) had sustained head injury in violence, while rest of the patients (n=18, 16.6%) had various causes as shown in the Figure 1.

The interval between trauma and operation was less than 6 hrs in 41 patients (37.9%), between 6 and 12 hours in 45 patients (41.6%) and more than 12 hours in 22 patients (20.3%). Those operated earlier had better outcome than those operated after 12 hours. The mortality rate was high in patients who were operated after 12 hours of trauma.

The Glasgow coma score immediately before surgery was 13-15 in 45 (42 %) patients, 9-12 in 46 (43 %)patients and below 8 in 17 (16 %)patients. The size of the haematoma was graded small, medium and large on the basis of scale given on CT films and numbers of slices, which revealed the haematoma (Table 2).

Associated lesions were present in 55 patients (50.9%). The mortality rate in our series was 8 % (7). Patients who were operated more than 12 hours after trauma, had bilateral dilated pupils and GCS below 8 at the time of surgery, and large size haematoma had significantly higher

## SIZES OF HAEMATOMA AND GCS BEFORE AND AFTER SURGERY

Size of Haematoma	Patients	GCS Before Surgery		GCS After Surgery	
Small	30	13-15	19	13-15	22
		09-12	09	09-12	06
		8 & below	02	8 & below	02
Medium	41	13-15	16	13-15	29
		09-12	20	09-12	09
		8 & below	05	8 & below	03
Large	37	13-15	10	13-15	23
		09-12	17	09-12	11
		8 & below	10	8 & below	03

Table 2

morbidity and mortality. Mortality was higher in patients in age group 45-60 years. The postoperative significant brain oedema had very high mortality.

### DISCUSSION

Acute extradural haematoma is one of the known complications of head injuries. If not diagnosed and operated in time may lead to a high morbidity and mortality<sup>8</sup>. Favorable outcome could be ensured only if the extradural haematoma is evacuated before the onset of brain dysfunction<sup>9</sup>. The mortality following the treatment of acute extradural haematoma varies from 15% to 45 %<sup>10</sup>. The mortality rate has been reduced considerably after the introduction of CT Scan, timely intervention and good postoperative care<sup>11</sup>. However a number of factors affect the ultimate outcome. Considering these factors, outcome of the surgical treatment can be significantly modified.

In our study, favorable outcome was achieved in 74 patients (69 %), in terms of Glasgow coma score of 13-15. In 26 cases (24 %) there was moderate disability and 08 patients (10.1%) remained vegetative or died. Factors that were found to considerably affect the outcome were age of patients, mode of injury, time interval between the trauma and operation, neurological status at the time of surgery, size of haematoma and postoperative condition of the brain. It was found that patients below 40 years of age, who were operated within 12 hours of trauma had better outcome as compared to the patients who were operated late. The presence of associated lesions like cervical trauma, chest injuries and severe brain swelling increased the mortality rate. In patients, who had considerable brain swelling, the co existence of diffuse axonal injury was considered to be a critical issue<sup>12</sup>, which could not be detected by CT scan.

In our study patients with severe brain swelling after the evacuation of haematoma were presumed to have diffuse axonal injury. Neurological condition before surgery and interval between trauma and surgery were found to be important factors in deciding the outcome<sup>13,14</sup>. In our series 26 patients with moderate disability were operated at interval of more than 12 hours. The reasons were delay in transportation to the hospital. They probably developed complications like asphyxia and ischemic changes in brain due to prolonged compression and herniation<sup>16</sup>. The mortality rate of 08% was considerably lower than most of the reported series. Kvarnes and Trumhpy<sup>15</sup> showed the mortality rate of 23% in the series of 132 patients.

### CONCLUSION

Our results indicate that younger patients in whom surgery is done earlier and have no or minimal associated brain injuries recover better than the patients in whom surgical intervention is delayed. The condition of brain immediately after evacuation has very strong impact on the final outcome. In patients whom brain is slaking after evacuation recovered to good functional status than those with brain swelling, which is probably due to diffuse axonal injury.

### REFERENCES

1. Brown SR, Raaine C, Robertson CE, Surann IJ. Management of minor head injuries in the accident and emergency department: the effect of an observational ward. *J Accid Emerg Med* 1994; 11: 144-8.
2. Durand P, Adamson GJ. On the field management of athletic head injuries. *J Am Acad Orthop Surg* 2004; 12(3): 191-5.
3. Guay J: Estimating the incidence of extradural haematomas- is there enough information? *Can*

- J Anaesth 2004; 51(5): 514-5.
4. Ibaez J, Arikian F, Pedraza S: Reliability of clinical guidelines in the detection of patients at risk following mild head injury: results of a prospective study. J Neurosurg 2004; 100(5):825-34.
  5. Cordobes F, Lobato RD, Rivas JJ, et al. Observation of 82 patients with extradural haematoma. Comparison of results before and after the advent of computerized tomography. J Neurosurg 1981; 54: 179-86.
  6. Ramazan A, Wani A, Malik AH, Kirmani A, Wani MA. Acute bilateral acute extradural haematomas. Neurol India 2002; 50(2):217-9.
  7. Buzdar H. Acute extradural haematoma analysis-factors influencing the outcome of patients undergoing surgery in coma. J Coll Physicians Surg Pak 1999; 9:511-4.
  8. Arrind D, Shibu VP, Kollari S. Does volume of extradural haematoma influence management strategy and outcome. Neurol India 2004; 52(4):443-5.
  9. Cannon SE, Chandler C, Jarosz JM: Traumatic sequential bilateral extradural haematoma in a child. Acta Neurochir (wien) 2002; 144(1):107-8.
  10. Brook C, High WM. Functional Outcome from traumatic brain injury: unidimensional or multidimensional ? Am J Phys Med Rehabil 1996; 75:105-13.
  11. Chesnut RM, Marshall LF, Klauber MR, et al. The role of secondary head injury in determining outcome from severe head injury. J Trauma 1993; 34: 216-22.
  12. Adams JH, Murray LS, Diffuse axonal injury due to non-missile in humans an analysis of 45 cases. Ann Neurol 1982; 12: 557-63.
  13. Rochat P, Johannesen HH, Poulsgard L, Bogeskov L: Sequentially evolved bilateral extradural haematoma. Clin Neurol Neurosurg 2002; 105(1):39-41.
  14. Ali M, Filza F, Khan T. Outcome assessment of acute extradural haematoma. Pak J Neurol Surg 2003; 7: 22-8.
  15. Kvarnes TI, Trumphy JH: Extradural haematoma. Report of 132 cases. Acta Neurochir 1978; 42:21-2.
  16. Ghani E, Nadeem M, Bano A, et al. Road traffic accident as a major contribution to neurosurgical mortality in adults. J Coll Physicians Surg Pak 2003; 13: 143-5.

#### Address for Correspondence

Dr Shahid Ayub  
Senior Registrar  
Department of Neurosurgery,  
PGMI Hayatabad Medical Complex Peshawar.