

## Conservative Management of Extradural Hematoma in Minor Head Injury

MUHAMMAD AJMAL KHAN, MUHAMMAD ANWAR, MUHAMMAD AKMAL

*Naveed Ashraf, Khalid Mahmood*

*Department of Neurosurgery, Lahore General Hospital, Lahore*

### ABSTRACT

**Background:** Epidural hematoma is the accumulation of blood in potential space between skull and dura.

**Objective:** To determine the frequency of favourable outcome in conservative management of extradural hematoma in minor head injury.

**Material and Methods:** A total of 100 patients with head injury having extradural hematoma were selected for this study. This study was conducted from 15<sup>th</sup> August 2009 to 14<sup>th</sup> February 2010 at Department of Neurosurgery, Lahore General Hospital Lahore.

**Results:** Patients aged 5 to 60 years of both genders. Extradural hematoma was confirmed on CT scan brain in every minor head injury patient. Patients with extradural hematoma associated with moderate or severe head injury, extradural hematoma of any size with midline shift or effacement of ventricle and extradural hematoma in posterior fossa of any size were excluded from study. Follow up of CT scan was done within 8 hours and then after two weeks. In case of determination of GCS scan brain was done immediately. The mean age of the patients was  $21.8 \pm 9.7$  years. There were 72 (72%) male and 28 (28%) female patients with male to female ratio of 2.6:1. Glasgow Coma Scale (GCS) was 14 in 69 (69%) and 15 in 31 (31%) patients. Most of the patients (32%) were suffered in frontal site. The most significant factors associated with unfavourable outcome were younger age. There were (92%) patients had favourable while (8%) were un-favourable and were operated for removal of extradural haematoma. There was no mortality.

**Conclusion:** Small extradural haematoma can be managed conservatively in minor head injury, these cases especially frontal and narrative occipital region. However follow up CT scan brain should be performed in these 48 hours and at 2 weeks or any time when patient determines. If there is deterioration patient should be operated upon. Removal of extradural haematoma there was no mortality.

**Key Words:** Minor head injury, extradural hematoma, epidural hematoma, Glasgow Coma Scale.

### INTRODUCTION

Epidural hematoma is the accumulation of blood in potential space between skull and dura.<sup>1</sup> Epidural hematoma complicates 2% of cases of head trauma approximately 40,000 cases per year. Mortality rate associated with epidural hematoma have been estimated about 5 – 50%. The mode of injuries is fall, road traffic accident, and blunt injuries, assault and sports injury in extradural hematoma. Although extradural hematoma has been formed by trauma to the skull leading to

laceration of arteries, veins and dural venous sinuses occasionally but mostly arterial rupture is the main reason for it.<sup>2</sup>

Extradural hematoma causes compression of underlying brain which in turn leads to brain distortion, increase intracranial pressure and brain herniation. The clinical picture of extradural hematoma is deterioration of conscious level, lucid interval, headache, vomiting bradycardia, hemiparesis and pupillary changes.<sup>3</sup> Extradural hematoma in posterior fossa shows the symp-

toms of respiratory distress, cheyne – stokes breathing, neck rigidity and brain stem compression effects.<sup>4</sup>

Classically extradural hematoma appears on computed tomography (CT) scan as lenticular or biconvex extra-axial collection. After head injury Glasgow Coma Scale neurological deficit, size of hematoma, midline shift and age of the patients has significant effect on the management of extradural hematoma.<sup>5</sup>

Acute epidural hematomas are generally considered to require urgent operation for clot evacuation and bleeding control. It has become increasingly apparent, that many epidural hematomas will resolve with non operative management.<sup>7</sup> In a study by Dubey et al, 47 patients managed conservatively, favourable outcome was in 44 (93.0%) patients.<sup>8</sup>

This study is designed to determine the frequency of favourable outcome in conservative management of extradural hematoma, not exceeding than 30ml volume. Our results were favourable and comparable to the different studies of conservative management of extradural hematoma. It is better technique, safe, cost effective to the patients and reduces hospital stay.

**MATERIAL AND METHODS**

A total of 100 patients with head injury having extradural hematoma were selected from emergency department of Neurosurgery, Lahore General Hospital Lahore for this study. This study was conducted from 15<sup>th</sup> August 2009 to 14<sup>th</sup> February 2010 at the Department of Neurosurgery, Lahore General Hospital Lahore.

**Inclusion Criteria**

An informed consent was taken from patient or attendants of the patients. CT scan brain was done in all head injury patient to confirm the diagnosis of range was from CT scan brain was performed in every head injury patient. The Glasgow Coma Scale of 14 – 15 and initial computed tomography demonstrating extradural hematoma with minimal thickness of 1cm or volume of less than 30ml can be managed conservatively unless there is midline shift or any neurological deficit. Mild clinical symptoms or raised intracranial pressure such as headache, vomiting are treated symptomatically.<sup>6</sup>

**Exclusion Criteria**

Patients with extradural hematoma associated with moderate or severe head injury, extradural hematoma of any size with midline shift or effacement of ventricle and extradural hematoma in posterior fossa of any

size were excluded from study management protocol. The series of evaluation of GCS was done on daily basis up-till 2 weeks to see for favourable outcome. Follow up of CT scan was done after to confirm that 1 – 2 days and size of EDH had not of them after two weeks. In case of determination of GCS, CT scan brain was performed immediately. If the size of EDH increased or condition deteriorate then patient was operate for removal of EDH.

**Statistical Analysis**

All the collected data was entered into SPSS versions 11 and analyzed. Qualitative variables like sex and favourable or unfavourable outcome were presented as frequency and percentage. Quantitative variable like age was presented as mean and standard deviation. Chi Square test was applied for significance of outcome i.e. favourable and unfavourable.  $P \leq 0.05$  was considered as significant.

**RESULTS**

**Age Range**

The age range was 5 – 60 years. The mean age of the patients was  $21.8 \pm 9.7$  years.

**Sex Incidence**

There were 72 (72%) male patients and 28 (28%) female patients with male to female ratio was 2.6:1 (Table 1).

**Table 1:** Sex Incidence.

Sex	No. of Patients	Percentage
Male	72	72%
Female	28	28%
Total	100	100%

**Conscious Level**

Sixty nine (69%) patients of 14 Glasgow coma scale and 31 (31%) patients had Glasgow Coma Scale of 15 (Table 2).

**Table 2:** Conscious Level (GCS).

GCS	No. of Patients	Percentage
14	69	69%
15	31	31%
Total	100	100%

**Outcome**

Most of the patients (32%) were suffered in frontal site. The most significant factors associated with unfavourable outcome were younger age. There were (92%) patients had favourable while (8%) were unfavourable (Table 3).

The size of haematoma, number of patients who deteriorated during conservative management are shown in Table 4.

**Table 3:** Frequency of outcome of patients after 3 weeks (n = 100).

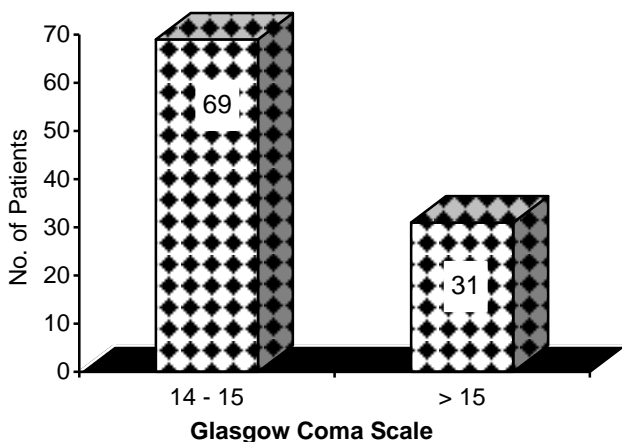
Outcome	No. of Patients	Percentage
Favourable	92	92.0
Un-favourable	08	08
Total	100	100.0

$\chi^2$  60.84                      DF 1                      p 0.001

**Table 4:** Site of EDH and Deterioration of Patients.

Site	Total		Deteriorated Surgery		Sub-total Percentage
	Number	Percentage	Number	Percentage	
Frontal	32		1	1%	3%
Temporal	28		4	4%	14%
Temperoparietal	25		2	2%	8%
Occipital	15		1	1%	6.6%
Total	100		8	8%	31.6%

$\chi^2$  60.84                      DF 1                      p 0.001



**Fig. 1:** Distribution of patients by Glasgow coma scale.

**DISCUSSION**

Epidural hematoma is a type of traumatic brain injury in which a buildup of blood occurs between the dura mater and the skull. The dura mater also covers the spine, so epidural bleeds may also occur in the spinal column. Our analysis had identified Glasgow Coma Scale, extradural hematoma volume and location of EDH as the factors that influenced the management strategy. Surgery is the standard treatment for extra-

dural hematoma but a significant number of patients having extradural hematoma can be managed conservatively which is safer cost effective, and has less complications. It was observed that the outcome was better with conservative treatment in patients with extradural hematoma volume of less than 30 ml in the supratentorial compartment. If the extradural hematoma was in temporal region is of same volume, then it needs strict observation and follow-up, because the patients harbouring these hematomas are known to deteriorate and required urgent intervention.

In our study the mean age of the patients was 21.8 ± 9.7 years. As compared with the study by Bhargava,<sup>9</sup> cucciniello<sup>10</sup> and Shackford and colleagues<sup>11</sup> showed that mean age was 23.4 years, 30.9 years and 27 years respectively. All these studies were done on small extradural hematomas, which were managed conservatively. In all these studies majority of patients were in young age group. This age group is more energetic, mobile hardworking and hence more prone to accidents and blunt injuries. The frequency of head injury in these age groups is higher than older age.

In our study 72% patients were male and 28% patients were female, with male to female ratio of 2.57:1. According to the study of Liebeskind, male to female

ratio was 4:1.<sup>12</sup> In another study reported by Babu<sup>2</sup> male were more affected than females. Another showed that 79% patients were male and 21% patients were female with male to female ratio 3:1.<sup>13</sup> A study done on conservative management of small extradural hematoma showed that 82.5% male and 17.5% female patients.<sup>14</sup> The results of all these studies are comparable with our study.

Majority of our 67% patients were in the first two decades of life. This age group is more vulnerable to injuries in road traffic accident etc. because they do not abide the traffic rules, adventurous, thrill seekers in odd situations. Our results are similar to other studies, because the trend and pattern of injury in this group is similar all over the world.

Glasgow Coma Scale is generally used to indicate the severity of head injury. In our study 69% patients had 14 Glasgow comas scale and 31% had GCS 15 i.e. mild head injury patients. In another study conducted by Balmer<sup>6</sup> Glasgow Coma Scale of 15 and an initial CT demonstrating an extradural hematoma with a minimal thickness of 1 cm was successfully managed conservatively.

If patient deteriorated computed tomography scan should be done and then surgery is carried out in these patients. Non-operative management has been advocated for small and asymptomatic epidural hematomas. The present study showed that 28% patients got temporal extradural hematoma in which 14% patients deteriorated, 3% of frontal, 6.6% of accepted and 8% patients of temporoparietal extradural hematoma also deteriorated and were treated surgically. The patients of temporal extradural hematoma developed expansion of hematoma and became symptomatic due to their mass effect in 14% cases. In all these patients repeat computed tomography was done and revealed that volume of extradural hematoma had increased. Surgery was performed in all these cases. Frontal 3%, Occipital 6.6% and temporoparietal 8% extradural hematoma showed deterioration and increased volume of hematoma on repeated CT scan. They were subjected to surgery. This showed that patients having temporal, temporoparietal, occipital extradural hematomas 28% deteriorated, more than hematomas in other 8%, Frontal lobe 3% locations, which is comparable with above mentioned study.

A study by Dubey<sup>8</sup> showed that outcome was classified as favourable if the patient was normal or had moderate disability but was independent, and as unfavourable if the patient was not independent. Another study done by Bezircioglu<sup>15</sup> had recommended the

volume of EDH less than 30ml should be conservatively managed. Bullock<sup>16</sup> found 12 – 38 ml is suitable for conservative without surgical management and obtained favourable results. In present study all patients having volume of 30ml or less were managed conservatively. Among them 8% patients had unfavourable outcome. Among them 14% patients had temporal extradural hematoma 3% patient of frontal lobe and 8% temporoparietal, 6.6% occipital region respectively.

### Unfavourable Outcome

Among those who had unfavourable outcome. Favourable outcome was observed in 92% of patients. In all these patients, the symptoms resolved within two weeks and volume of hematoma was also reduced in follow up CT scan. All of them were able to do their routine task independently after two weeks. Our results are comparable with above mentioned studies.<sup>6,14-16</sup>

The differences between the two management groups (favourable versus unfavourable) were analyzed using the Chi-square test. It is statistically highly significant ( $p < 0.001$ ).<sup>8</sup> The present study showed that most of the patients 92% were favourable and only 8% patients were unfavourable ( $p < 0.001$ ) which is comparable with the above study.

### CONCLUSION

It is the fact that early transportation or early reports by the patient to the hospital where neurosurgical services are available also have bearing on the final outcome in the management of extradural hematoma. Conservative treatment should be tried only if patient general condition is good, hematoma is small and at non-dangerous zone. Conservative treatment is given to extradural hematoma when serial computed tomography facilities are readily available. Small extradural haematoma can be managed conservatively in minor head injury, these cases especially frontal and narrative occipital region. However follow up CT scan brain should be performed in these 48 hours and at 2 weeks many times when patient determines. If there is deterioration patient should be operated upon. Removal of extradural haematoma there was no mortality.

*Address for Correspondence:  
Dr. Muhammad Ajmal Khan  
Department of Neurosurgery  
Lahore General Hospital, Lahore  
Mobile: 0321-6666767*

REFERENCES

1. Vilela M, West GA. Traumatic intracranial hematoma. In: Boen EGR. Principle of Neurosurgery. 2<sup>nd</sup> ed. London: Mosby; 2005: 361-2.
2. Babu ML, Bhasin KS, Kumar A. Extradural hematoma. An experience of 300 cases. J K Science 2005; 205-7.
3. Is M, Kaltirik K. Mydriasis as a falsely localizing sign in epidural hematoma: a case report? Neurosurgery Quarterly 2007; 17: 74-5.
4. Dirin BV, Oruk C, Erdogo N, Gelal F, Ulue E. Traumatic posterior fossa hematoma. Diagn Interv Radiol 2005; 11: 14-8.
5. Ayub S, Ali M. Acute extradural hematoma. Factors affecting the outcome. J Postgrad Med Inst 2005; 19: 208-11.
6. Balmer B, Boltshauser E, Altermatt S, Gobert R. Conservative management of significant epidural hematomas in children. Childs Nerv Syst 2006; 22: 363-7.
7. Offner PJ, Pham B, Hawkes A. Non operative management of acute epidural hematomas: A "no brainer". Am J Surg 2006; 182: 601-5.
8. Dubey A, Pillai SV, Kolluri SVR. Does volume of extradural hematoma influence management strategy and outcome? Neurol India 2004; 52: 443-5.
9. Bhargava PP. Conservative management of extradural hematoma. A report of five cases. Int J Neurol 2009; 11.
10. Cucciniello B, Martellotta N, Nigro D, Citro E. Conservative management of extradural hematomas. Acta Neurochir (Wien) 1983; 120: 47.
11. Shackford SR, Ward SL, Ross SE. The clinical utility of computed tomographic scanning and neurologic examination in the management of patients with minor head injuries. J Trauma 1992; 33: 385-94.
12. Malik NK, Makhdoomi R, Indira B, Shankar S, Sastry K. Postero fossa extradural hematoma: our experience and review of the literature. Surg Neurol 2007; 68: 155-8.
13. Metellus P, Dufour H, Mauera L, Fueufes S. Spontaneous vertex EDH: Considerations about causes, case report and review of literature. J Neurosurg 2001; 94: 633-6.
14. Mishra A, Mohanty S. Contracoup extradural haematoma: A case report. Neurol India 2001; 49: 94-5.
15. Bezircioglu H, Ersahin Y, Demircivi F. Non-operative treatment of acute extradural hematomas: Analysis of 80 cases. J Trauma 1996; 41: 696-8.
16. Bullock MR, Chesnut R, Ghajar J, Gordon D, Hertl R, Newell DW, et al. Guidelines for the surgical management of traumatic brain injury. Neurosurgery 2006; 53: 327-9.