Faridpur Med. Coll. J. 2011;6(2):89-91

Original Article

Management Strategy and Outcome of Epidural Haematoma in Relation to Volume.

MM Islam[1], TH Bhuiyan[2], MK Hassan[3], MATM Asadullah[4], Z Raihan[5], SS Hossain[6].

Abstract

Epidural Haematoma (EDH) develops in 1-3% of all major head injuries and most common in the young. This cross-sectional descriptive study was done to find out the management strategy and outcome of EDH in relation to clot volume. This study was performed from December'2006 to November'2007, by purposively selecting 77 cases of EDH from the Department of Neurosurgery, Dhaka Medical College Hospital (DMCH), Dhaka. The study showed that highest number of patients was in most active period of life, with male predominance (Male: Female =7.5:1). Causes of EDH were mostly due to assault (37.7%), followed by RTA (32.5%) and fall from height (29.8%). The study showed Patient having EDH Volume (EDHV) > 30ml will have 8.55 times more chance of having unfavorable outcome than patient having EDHV ≤ 30 ml. Patient having EDHV > 30 ml will have 187.83 times more chance of requiring surgical intervention than those having EDHV ≤30 ml, which is statistically highly significant ($p<0.001$). Mortality rate of EDH can be reduced by giving early management either conservative or surgery. Delay in the management of EDH patients with poor level of consciousness and EDHV >30 ml has adverse effect on mortality and morbidity.

Key words: EDH, EDHV, Burr hole, GOS, GCS.

Introduction

Head Injury, a serious health problem in all nations, is a significant factor for approximately half of all deaths related to trauma. Main cause of head trauma includes road traffic accident, assaults, falls, sports injuries and industrial accidents. Epidural or extradural haematomas (EDH) develops in 1-3% of all major head injuries and are most common in the young male in the second and third decades of life[1]. It has been estimated that the financial burden of head injuries annually in the United States alone, in terms of loss of productivity and medical care costs, is approximately $100 billion[2]. In our country there is no such epidemiological statistics but report of the Bangladesh Bureau of statistics identifies RTA with head injury as one of the major causes of death[3]. Now a day, the best investigation to diagnose the epidural haematoma is the computed tomography (CT) scan. In the era before CT scan, the mortality due to epidural haematoma was 40-80% and after availability of CT scan, this mortality become 10%. The CT scan is relatively faster with accuracy[4].

There is lot of controversy in management and outcome of patient with EDH, though surgery is the treatment of choice for epidural haematoma but in some cases of small EDH non-surgical treatment can be performed. Patient with Glasgow Coma Scale (GCS) 14-15, haematoma smaller than 01 cm and with no midline shift demonstrated by CT scan, can be treated by conservative management with excellent outcome[5]. Both the volume of extradural haematoma and neurological status of the patient have been reported to influence the outcome of EDH[6]. In Bangladesh, health infrastructure is not at its best. Neurosurgical services are not available in district hospitals, even not in all medical college hospitals. Modern diagnostic tools like CT scan, MRI scan etc. are not available except in big cities. Neurosurgeons are not in enough numbers. So diagnosis becomes late. Patient with EDH reaches the neurosurgical centers when they are already in coma causing poor outcome although surgically managed.

1. Dr. Md. Monirul Islam, MS (Neurosurgery), Assistant Professor, Dept. of Neurosurgery, FMC, Faridpur.

2. Dr. Tofayel Hossain Bhuiyan, MS (Neurosurgery), Assistant Professor, Dept. of Neurosurgery, RpMC, Rangpur.

3. Dr. Md. Kamrul Hassan, MS (Paediatric Surgery), Assistant Professor, Dept. of Paediatric Surgery, FMC, Faridpur.

4. Dr. Md. ATM Asadullah, MS (Neurosurgery), Registrar, Dept. of Neurosurgery, ShSMCH, Dhaka.

5. Dr. Zahid Raihan, MS (Neurosurgery), Assistant Professor, Dept. of Neurosurgery, PMCH, Pabna.

6. Prof. Sk. Sader Hossain, FCPS (Surgery), Professor and Head, Dept. of Neurosurgery, DMC, Dhaka.

Address of correspondence
Dr. Md. Monirul Islam, MS (Neurosurgery), Assistant Professor, Dept. of Neurosurgery, FMC, Faridpur. Phone: +088-01715-253209. E-mail: mdmonir1966@yahoo.com.

In this context, this cross-sectional study was done to find out an acceptable management strategy and outcome of acute EDH in relation to volume of clot and to make a guideline of treatment either conservative or surgery for EDH.

Materials & Methods:

This descriptive type of cross-sectional study was carried out from December 2006 to November 2007 in the Department of Neurosurgery, Dhaka Medical College Hospital (DMCH). A total 77 consecutive patients with acute traumatic epidural haematoma irrespective of all age and sex groups were selected from Neurosurgery Department, DMCH for this study. All the cases were diagnosed clinically and radiologically by non contrast CT scan of the brain. Those not attending for follow-up were excluded. On admission, a detailed history of the illness was taken from the patients/patient`s attendants by face to face interview with the help of a pre-formed questionnaire. The epidemiological data and follow-up were recorded. The volume of haematoma was calculated from CT scan by measuring the diameters (length, width and height) & by using PETERSEN and ESPERSON equation: $(a \times b \times c) \times 0.52$ where 'a', 'b' and 'c' represent the length, width and height of haematomas. Most of the Epidural haematoma volume <30 ml were managed conservatively and most cases volume >30 ml were managed surgically. Outcome of EDH were determined as per Glasgow outcome scale (GOS) score.

Results:

In our study, highest number of patients was in most active period of life. The mean age was 26 years. Male and female ratio was 7.5:1. Most of the cases of EDH were due to Assault, 29 patients (37.7%). Other causes were RTA 25 cases (32.5%), fall from height 23 cases (29.8%). We found the most common location of distribution of EDH was parietal and temporoparietal region.

Out of 77 cases with EDH, total 26 (33.7%) cases had EDHV <30 ml and 51 (66.3%) had EDHV > 30 ml. Most of the cases having volume < 30 ml got conservative management except 03 cases who undergone for surgery as they deteriorated later on. Out of 51 cases of EDH having Volume > 30 ml, 49 had got surgical management, only 02 cases undergone conservative management (though their clot volume was > 30 ml) as they had a good GCS(13-15) from the very beginning. (Table I)

Table I: Distribution of management strategy in relation to the EDHV (n=77).

	EDHV		
Management	≤ 30 ml	>30 ml	Total
Conservative	23 (88.5)	2 (3.9)	25 (32.5)
Surgery	3 (11.5)	49 (96.1)	52 (67.5)
Total	26 (33.8)	51 (66.7)	77 (100.0)

p value<0.001

Figure in parenthesis indicate percentage.

In our study, 52 cases were managed surgically, either craniotomy or craniectomy for evacuation of haematoma. Rest of 25 cases underwent conservative management. GCS at the time of admission and EDHV were found important factors influencing the management strategy and outcome of EDH. Initial GCS < 08 and/or EDHV > 30 ml were found bad prognosis and should be managed surgically. The comparisons of the cases in two outcome group are shown in the (Table II) which indicates that the significant factors for unfavorable outcome were lower GCS and higher EDHV.

Table II: Comparison of outcome groups (n=77)

Category	Favorable (n=63)	Unfavorable (n=14)	p value
Age	26.7 ± 13.08 yrs.	34.36 ± 15.75 yrs.	0.060
Sex	55 males	12 males	1.00
GCS	11.52 ± 2.994	7.50 ± 3.322	0.001
EDHV	48.96 ± 27.51 ml	82.03 ± 34.70 ml	0.001
Location			
• Temporal	4	0	
• Frontal	12	3	
• Parietal	20	1	
• Temporo parietal	15	4	
• Frontoparietal	3	2	
• Parietooccipital	3	1	
• Frontotemporal	3	0	
• Bifrontal	1	2	
• Frontoparietal	2	1	
Management	39 (75) surgery	13(25) surgery	0.02
Mortality	0 (0)	6 (42.8)	0.001

Figure in parenthesis indicate percentage

The logistic regression analysis done for the factor EDHV which showed, patients having EDHV >30 ml have 8.553 times more chance of unfavourable outcome than patients having EDHV <30ml. Logistic regression analysis done by the factor EDHV which showed, patients having EDHV >30 ml have 187.83 times more chance of undergoing surgery than patients having EDHV <30ml. It is statistically highly significant ($p<0.001$).

Discussion:

The study was aimed to find out the management strategy and outcome of acute epidural haematoma in respect of volume of clot. Our study finds that GCS and EDHV are the most important factors influencing the management strategy and outcome of EDH. EDHV < 30 ml has better outcome than EDHV > 30 ml. This finding correlated with the finding of Bezicioglu et al[7], which states, the patient with an EDHV < 30 ml can be managed conservatively. Rivas et al[8] in 1998 found that the unfavorable outcome of EDH was determined by rapid clinical deterioration and EDH volume more than 150 ml.

Study shows location of EDH in the parietal region 27.3%, temporo-parietal region 24.6%, Miller and Statham[9] showed that the 70% of haematoma are located in temporo-parietal region. Out of 77 patients 63 cases had favorable outcome and 14 patients had unfavorable outcome. Those cases whose GCS was 3-8 had worst outcome. Heinzelemann et al and Mohanty et al in their study established that lower GCS is an important factor influencing the outcome of EDH[10,11].

Dubey et al in their article stated that the most significant factors associated with unfavorable outcome were higher age, lower GCS, and higher EDHV[12]. In our study, when these factors were entered in a stepwise logistic regression analysis with outcome as dependent variable, EDHV was found to be the most important factor influencing outcome. The outcome of patients with EDHV above and below 10 ml and every additional 5 ml above that was analyzed and only at and above 30 ml, there was a significant difference in outcome. The proportion of unfavorable outcomes was higher in the >30 ml group. Patients having EDHV > 30 ml had found 8.55 times more chance of unfavorable state than patients having EDHV <30 ml and patients having EDHV >30 ml had found 187.83 times more chance of undergoing surgery than patients having EDHV <30 ml. It is statistically highly significant ($p<0.001$).

Head injured patient needs multi-disciplinary support. But we have limited facility to give them in proper time. In our hospital we have no neurosurgical intensive care unit. Patients after surgery we could not arrange intensive support to all comatose patient. These factors make the mortality & morbidity higher. Zero patient mortality as proposed by Bricolo[13], which is still away from us, but not impossible to achieve.

References

1. Netter FH. The CIBA collection of Medical illustrations, In: Jones HR, editor. Central Nervous System Trauma .NJ: West Caldwell; 1986. p.92-96.

2. Karus JF. Epidemiology of Head Injury, In: Cooper PR. Williams W, editors. Head Injury ed. Baltimore; 1993. p.2-5.

3. Bangladesh Bureau of Statistics. Statistical Pocket book of Bangladesh 2000, Dhaka.

4. Lee EJ, Hung YC, Wang LC, Chung KC, Chen HH. Factors influencing the functional outcome of patients with acute epidural haematomas: analysis of 200 patients undergoing surgery. J Trauma 1998; 45(5):946-952.

5. Pereira CU, Barbosa JD, Leao C, Ribas A, Santos EAS, Monteiro JTS. Epidural haematoma: Analysis of 30 cases. The Intemet Journal of Emergency Medicine 2005; 2(2):8-12.

6. Servadei F, Faccani G, Roccella P, Seracchioli A, Godano U, Ghadirpour R, et al. Asymptomatic extradural Hematomas. Results of multicenter study of 158 cases in minor head injury. Acta Neurochir(wien) 1989; 96:39-45.

7. Bezireigin H, ErsahinY, Demireivi F, Yurt I, Donertas K, Tegtas S. Nonoperative treatment of acute extradural hematomas; Analysis of 80 cases. J Trauma 1996; 41:696-8.

8. Rivas JJ, Lobato RD, Sarabia R, Cordobes F, Cabera A, Gomez P. Extradural haematoma: analysis of factors influencing the courses of 161 patients. Neurosurgery 1998; 23(1):44-51.

9. Miller JD, Statham PX. Surgical management of Traumatic Intracranial Hematoma, In: Schmidek HH, editor. Schmidek and Sweet Operative Neurosurgical Technique Indications, Methods and Results, 4th ed. W.B. Saunders Company, Philadelphia; 2000.p. 83-84.

10. Heizelmann M, Platz A, Imhof HG. Outcome after acute extradural haematoma, influence of additional injuries and neurological complications in the ICU. Injury1996; 27(5):345-349.

11. Mohant A, Kolluri VR, Subbakrishna DK, Satish S, Mouli BA, Das BS. Prognosis of extradural haematomas in children. Pediatr Neurosurg 1995; 23(2):57-63.

12. Dubey A, Pillai SV, Kolluri SVR. Does volume of extradural haematoma influence management strategy and outcome? Neurology India 2004; 52(4):443-445.

13. Bricolo AP, Pasut LM. Extradural haematoma: Toward zero mortality. A prospective study. Neurosurgery1984; 14:8-12.