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Research Article

OUTCOME OF TRAUMATIC EXTRADURAL HEMATOMA- A PROSPECTIVE ANALYSIS

Birla Rahul Sanjay., Wilkinson T.Raju Vinay., Hazara Abhijit Fulare Sushrut and Akhtar Murtaza

Department of Surgery, N.K.P Salve Medical College, Nagpur. Maharashtra India

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ABSTRACT

Introduction: Epidural hematoma accounts for 1% to 2% of Traumatic Brain Injury and 5% to 15% of fatality.

Aims: A study was to determine prognostic factors affecting the outcome in patients with extradural hematoma in a rural set up.

Settings and Design: prospective of study was carried out at the department of surgery in a rural based tertiary care hospital from October 2012 to October 2014.

Methods and Material: Patients admitted with extradural hematoma diagnosed on imaging study [plain computed tomography of brain] were included in study. Patients with associated life threatening injuries such as intra-abdominal, intrathoracic and pelvic injuries were excluded from the study. A total of 58 cases were diagnosed as extradural hematoma on imaging study. 5 patients were excluded. Thus, 53 patients were included in study. Demographic data, history, mode of trauma, examination findings, investigations and outcome were recorded. Glasgow coma scale was used for initial assessment and Glasgow outcome scale was applied at the time of discharge to assess outcome in terms of neurological recovery in all patients.

Statistical analysis : Univariate and multivariate analysis were performed using statistical software 13.1.

Results: Maximum percentage of patients belonged to age group 21-30 years (37.74%). Males (38) were more commonly affected than female (15) with ratio of 2.5:1. Commonest mode of injury was a road traffic accident (73.58%) followed by fall (24.53%) and assault (1.89%). In Univariate analysis, heart rate on admission, presence of neuro-motor deficit, Glasgow coma scale score on admission, volume of hematoma, pupillary changes, presence of depressed skull fractures, temporal site of skull fracture and presence of midline shift were statistically significant with outcome. In multivariate analysis, Glasgow coma scale score on admission and volume of hematoma were independent prognostic factor for outcome.

Conclusions: In India rural setup, predominantly young males are affected. Road traffic accident was the most common cause of injury. GCS on admission and volume of hematoma were most important independent predictors of outcome.

INTRODUCTION

Epidural hematoma (EDH) accounts for 1% to 2% of Traumatic Brain Injury and 5% to 15% of fatality.[1] The peak incidence of extradural haematoma (EDH) is in the second decade of life and mean age of patient with EDH in different series is between 20 and 30 years of age.[2] Extradural hematoma is very rare in extremes of ages. Males are affected more frequently than females, in a ratio of 4:1.[3] In India, extradural hematomas are most commonly seen in traffic accidents (59%), falls (25%), and assaults (10%).[2] In the adult population, traffic-related accidents (53%) are the most common cause, followed by falls (30%) and assaults (8%).[2]In children, falls are the most common cause, followed by traffic-related accidents.[2]In literature, the following parameters were found to be significantly related to outcome in patients with epidural hematoma: age, time from injury to treatment, immediate coma or lucid interval, secondary insult (hypotension, hypertension and hypoxia) presence of pupillary abnormalities, GCS motor score on admission, CT findings (hematoma volume, degree of midline shift, presence of signs of active hematoma bleeding, associated intradural lesion), and postoperative ICP.[4]Published Indian literature is limited with

Corresponding author:* **Birla Rahul Sanjay
Department of Surgery, N.K.P Salve Medical College, Nagpur. Maharashtra India

mostly retrospective analysis. Prospective data of demographic profile, cause and prognostic factors for outcome is very limited and come from western literature. There is a lack of reliable data regarding extradural hematoma in rural area. This study was to analyze aspects of the epidemiology, outcome of extradural hematoma [measured by the Glasgow Outcome Scale (GOS)] and to determine factors affecting the outcome in patients with extradural hematoma in a rural set up.

MATERIALS AND METHODS

This prospective study was carried out at the department of surgery in a rural based tertiary care hospital from October 2012 to October 2014. All head injury patients diagnosed to harbour extradural hematoma on imaging study (plain CT brain); were considered for the study. Patients with Extradural hematoma having associated life threatening injuries such as intra-abdominal, intrathoracic and pelvic injuries were excluded from the study. A total of 58 patients were diagnosed as extradural hematoma by imaging study (plain CT brain). 5 patients were excluded due to associated intra-abdominal, intrathoracic and pelvic injury. Thus, 53 patients were included in study.

Data was recorded with the help of a structured Proforma which included age, gender, mode of injury , initial GCS score on admission, clinical presentation of extradural hematoma and CT scan findings (site of extradural hematoma, side of hematoma, volume of hematoma, midline shift, associated intracranial lesion, associated skull fracture, type of skull fracture), management and outcome.

Outcome of the patients in terms of Glasgow Outcome Score (GOS) was assessed at the time of discharge. There were five possible outcomes i.e. good recovery, moderate disability, severe disability, vegetative state and death.[5] In the present study, the patients were divided into two categories i.e. Favourable outcome and Unfavourable outcome. Favourable outcome group includes good recovery and unfavourable outcome group includes moderate recovery, severe disability, vegetative and dead.

Statistical Analysis

Continuous variables (GCS On Admission, volume of hematoma) were presented as mean±SD. Categorical Variables (age, gender, mode of injury, symptoms and signs, GCS on admission, skull fracture, associated significant intracranial lesions, side of hematoma, site of hematoma, management and midline shift) were expressed in actual numbers and percentages. Continuous variables were compared between favorable and unfavorable outcome by performing non-paired T test for normalized data. Man -Whitney test was used for non-normalized data. Categorical variables were compared by Pearson's chi-2 test. For small numbers, Fischer's exact test was applied wherever applicable. $P<0.05$ was considered as statistically significant. Multivariate analysis was performed to determine the independent risk factors with logistic regression analysis. Statistical software 13.1 was used for statistical analysis.

RESULT

Fifty-three patient's were enrolled, maximum percentage of patients belonged to age group 21-30 years (37.74%), followed by 31-40 years (28.30%) age group. Mean age of presentation was 30.74 years with range between 2 years to 60 years. [Table 1].Thirty-eight (71.70%) cases were male and 15 (28.30%) cases were female. Male to Female ratio was 2.5:1. Thus, males were more commonly affected than female. [Table 1].Commonest mode of injury was a road traffic accident (73.58%) followed by fall (24.53%) and assault (1.89%) [Table 1]. 46 (86.79%) cases were managed medically and 7 (12.50%) cases underwent surgery [Table 1]. Fourty-two (79.24%) cases had a good recovery, 10 (18.87%) cases had moderate disability, 1 (1.89%) case had severe disability, (0%) had vegetative cases and dead (0%).[Table 1]. Due to small sample size, outcome was divided into favourable outcome group and unfavourable outcome group for univariate and multivariate analysis. Fourty-two cases were favourable outcome group and 11 cases were unfavourable outcome group **[Table 1].** Mean GCS score on admission of favourable outcome was 13.40 ± 1.27 and mean GCS score on admission of unfavourable outcome was 10.63 ± 2.01.Range of the GCS score on admission of favourable outcome was 11-15 and range of the GCS score on admission of unfavourable outcome was 8-15.As a P value<0.01, the difference in outcome with GCS score on admission was statistically highly significant, thus the GCS score was a prognostic factor for outcome**[Table 2].** Mean volume of hematoma of favourable outcome was 14.01 ± 8.04ml and mean volume of hematoma of unfavourable outcome was 28 ± 17.37ml.Range of volume of hematoma of favourable outcome was 0.81-37 and range of volume of hematoma of unfavourable outcome was 1.8-64. As P value<0.01, the difference in outcome with a volume of hematoma was statistically highly significant, thus the volume of hematoma was a prognostic factor with outcome [Table 3]. In Univariate analysis, heart rate on admission , presence of neuro-motor deficit, GCS on admission, volume of hematoma, pupillary changes, presence of depressed skull fractures, temporal site of skull fracture and presence of midline shift were statistically significant with outcome. All other variables had no statistically significant relationship with outcome on univariate analysis.[Table 4] In multiple logistic regression analysis, we included the variables those were found significant on univariate analysis like heart rate on admission , presence of neuro-motor deficit, GCS score on admission, volume of hematoma, pupillary changes, depressed skull fractures, temporal site of skull fracture and presence of midline shift. Depressed skull fractures, tachycardia, neuro-motor deficit and temporal site of skull fracture were dropped from the model during analysis. Following variables remained in the final model. The table shows that GCS score on admission and volume of hematoma were statistically significant with the outcome. Thus, they were independent predictors of outcome. Midline shift, pupillary changes, heart rate, depressed skull fracture and neuro-motor deficit were not independent predictors of outcome. [Table 5].

Table 1 Patient characteristics

Variables		Number of cases
Age in years	0-10	4(7.55%)
	11-20	4(7.55%)
	21-30	20(37.74%)
	31-40	15(28.30%)
	41-50	6(11.32%)
Gender	Male	38 (71.70%)
	Female	15 (28.30%)

Mode of injury	Road Traffic Accident	39(73.58%)
	Falls	13(24.53%)
	Assault	1(1.89%)
Management	Conservative	46(86.79%)
	Operative	07(12.50%)
Glasgow outcome scale	Good recovery	42(79.24%)
	Moderate disability	10(18.87%)
	Severe disability	1(1.89%)
	Vegetative	0(0%)
	Dead	0(0%)
Outcome	Favourable	42
	Unfavourable	11

Table 2 Mean GCS scores on admission in 2 groups. (Unpaired t test)

	Favourable Outcome	Unfavourable Outcome
Mean	13.40	10.63
SD	1.27	2.01
Range	11-15	8-15
Confidence interval	(13.01-13.80)	(9.28-11.98)
P-value	<0.0001, HS*	

*HS- Highly Significant.

Table 3 showing Correlation of Mean Volume of extradural hematoma in 2 groups. (Unpaired t test)

Volume of extradural hematoma(ml)	Favourable outcome	Unfavourable outcome
Mean	14.01	28.34
SD	8.04	17.37
Confidence interval	(11.50-16.52)	(16.67-40.01)
Range	0.81-37	1.8-64
P-value	0.0002,HS*	

*HS- Highly significant

Table 4 Univariate Analysis

		Number of Cases	Favourable outcome	Unfavourable outcome	P value
Age in yr.	0-18	6	5	1	0.708, NS
	18-45	42	32	10	
	>45	5	5	0	
Gender	Male	38	29	9	0.403NS
	Female	15	13	2	
Mode of Injury	RTA	39	30	9	0.769 NS
	Fall	13	11	2	
	Assault	1	1	0	
Loss of consciousness	Present	46	36	10	0.650, NS
	Absent	7	6	1	
Vomiting	Present	29	22	7	0.508, NS
	Absent	24	20	4	
Ear/nasal bleeding	Absent	39	29	10	0.251, NS
	Present	14	13	1	
Convulsion	Absent	50	40	10	0.510 , NS
	Present	3	2	1	
Heart rate	Normal	51	42	9	0.040, S*
	Abnormal	2	0	2	
Blood Pressure	Normal	51	41	10	0.375, NS
	Abnormal	2	1	1	
Neuro-motor deficit	absent	51	42	9	0.045, S*
	Present	2	0	2	
Lucid Interval	Absent	49	40	9	0.187, NS
	Present	4	2	2	
Pupillary changes	Normal	47	41	6	0.0005, HS**
	Abnormal	6	1	5	
GCS Score on admission	14-15	21	20	1	0.011, S*
	9-13	31	22	9	
	5-8	1	0	1	
	3-4	0	0	0	
Side of hematoma	Left	24	17	7	0.256, NS
	Right	28	24	4	
	Bilateral	1	1	0	
Associated Skull Fracture	Present	47	40	7	0.645, NS
	Absent	6	5	1	
Type of Skull fracture	Communated	18	15	3	0.599,NS
	Depressed	2	-	2	0.04,S*
	Linear	29	24	5	0.488,NS
	Displaced	9	8	1	0.556,NS
Associated significant intracranial lesion	Present	31	22	9	0.097, NS
	Absent	22	20	2	
Midline shift	Midline Shift	5	1	4	0.0043, S**
	No Midline Shift	48	41	7	
Magnitude of midline shift from midline	>5 mm	4	1	3	0.57NS
	<5 mm	1	0	1	

NS- not significant, S- statistically significant, HS- highly significant.

Table 5 shows multiple logistic regression analysis

Variable	OR	P-value	95%C.I.
GCS scores on admission	0.15	0.022	0.028-0.76
Volume of hematoma	1.23	0.013	1.04-1.45
Midline Shift	34.15	0.082	0.64-1824.44
Pupillary changes	357.84	0.263	0.012-1.05

O.R.- Odd's Ratio, C.I.- Confidence Interval

DISCUSSION

Age Distribution [Table no. 1]

Most commonly age group affected was 21-30 years, which was similar to M.L.Babu *et al*(2005).[6]The maximum percentage of extradural hematoma occured in 21-30 years aged group because thesepatients had a higher exposure to risk situations such as driving at high speed without the use of safety belts or riding motorcycles without a helmet, making them more vulnerable to head injuries and epidural hematomas. Mean age of presentation was 30.74 years, which were comparable to studies of Wilfred C Mezue *et al* (2012)[7]and Mian Iftikhar ul Haq *et al* (2014).[8]

Gender Distribution [Table no. 1]

Thirty eight (71.70%)cases were male and 15 (28.30%) cases were female. Male to Female ratio was 2.5:1 this was quite consistent with the studies of Lal Rehman *et al* (2008) .[9]Thus, males were more commonly affected than females because males were more mobile and travel more for their day-to-day activities as compared to female.

Mode of Injury [Table 1]

Commonest mode of injury was a road traffic accident (73.58%) followed by a fall (24.53%) and assault (1.89%) which was comparable with study of Phoebe S.Y. Cheung *et al* (2007).[10]But the percentage of road traffic accidents were more than study of Phoebe S.Y. Cheung *et al* (2007)[10] because of urbanisation where peoples were driving recklessly with high speed vehicles, not following traffic rules, poorly designed road, poorly street light condition, alcoholism etc. Fall was the next most common cause accounting for 24.53% of the present study that was consistent with the study of Phoebe S.Y. Cheung *et al* (2007)[10]. This may be due to the large amount of constructions going on in the surrounding area.

The assault was the least common mode of injury, accounting for only 1.89% of the present study, which was not comparable with study of Phoebe S.Y. Cheung *et al* (2007)[10]. This may be due to decreased incidence of crime and improved literacy rate.

Management [table 1]

Seven (12.50%) patients were operated and 46(86.79%) patients were medically treated. This was not comparable to other studies of Phoebe S.Y. Cheung *et al* (2007)[10]and Wilfred C Mezue[2] *et al* (2012).[7] Large number of cases were medically treated due to small volume of hematoma (< 30 cm3), less than a 5-mm midline shift in a patient with a GCS score higher than 8 and no focal deficit.

Outcome at the time of Discharge [Table 1]

Forty-two (79.24%) cases had good recovery, which was comparable with studies done by Phoebe S.Y. Cheung *et al* (2007)[10] and Lal Rehman *et al*(2008)[9]. 10 (18.87%) cases had moderate disability which was not comparable with studies of Phoebe S.Y. Cheung *et al*(2007)[10] and Lal Rehman *et al*(2008)[9]. The high percentage was due to decrease in the percentage of severe disability in the present study. Mortality is 0%, which was not comparable with studies mentioned in the table below. This was due to early diagnosis by routine CT examination, no delay in management, easy accessibility of neurosurgeons, intensive care facilities for cranial trauma.

Mean GCS score on Admission in 2 Groups [table no. 2]

Mean GCS score on admission of favourable outcome was 13.40±1.27SD and mean GCS score on admission of unfavourable outcome was 10.63±2.01SD. There were statistical differences in outcome due to mean GCS score on admission. Thus the high GCS score had favourable outcome and low GCS score had unfavourable outcome.

Mean Volume of Extradural Hematoma in 2 Groups [table no. 3]

Mean volume of hematoma of favourable outcome was 14.01±8.04ml and mean volume of hematoma of unfavourable outcome was 28±17.37ml. As P value<0.01, the difference in outcome with a volume of hematoma was statistically highly significant, thus small volume of hematoma had favourable outcome as compared to the large volume of hematoma which had unfavourable outcome. This finding was compared with the study done by Islam, MJ *et al* (2011)[11] and Ümit Özkan *et al*(2007)[12].

Factors that Predict the Outcome of Extraduralhematoma [table no.4]

In Univariate analysis, heart rate on admission , presence of neuro-motor deficit, GCS score on admission, volume of hematoma, pupillary changes, depressed skull fractures, temporal site of skull fracture and midline shift were predictor for outcome that were comparable with studies of Ümit Özkan *et al*(2007),[12] Islam MJ *et al*(2011)[11]and Khan MB *et al*(2013).[13] In the present study, age and gender were not predictors for outcome that were not comparable to studies of Ümit Özkan *et al*(2007),[12] Islam MJ *et al*(2011)[11]and Khan MB *et al*(2013).[13] The reason may be due to small sample size. Depressed skull fracture and heart rate are predictors of outcome.

Multiple Logistic Regression Analysis [table no. 5]

Logistic regression analysis was done to measure the strength of the associationbetween outcome of the disease process and GCS score on admission, volume of EDH, presence of midline shift, pupillary changes, heart rate, depressed skull fracture, presence of neuro-motor deficit. In the present study, GCS score on admission and volume of hematoma were independent predictors of outcome that were comparable with studies done by Islam, MJ *et al* (2011)[11] and Ümit Özkan *et al*(2007).[12] In study of Islam, MJ *et al* (2011)[11], GCS score was the only significant predictor of the outcome of EDH.In Ümit Özkan *et al*(2007)[12] volume of the hematoma was an independent predictor of outcome in patients with extradural haematoma.

CONCLUSION

It was more common in younger adult aged group. Males were more commonly affected than female. Most common modes of injury was road traffic accident followed by fall and assault. GCS score on admission, volume of hematoma, pupillary changes, depressed skull fractures, temporal site of skull fracture, tachycardia, presence of neuro-motor deficit and presence of midline shift were prognostic factor for outcome in univariate analysis. GCS score on admission and volume of hematoma were independent prognostic factor for outcome in multiple logistic regression analysis.

References

1. Lindenberg R: Trauma of meninges and brain. Pathol Nerv Syst 1971; 2: pp. 1705
2. Langlois J, Rutland-Brown W, Thomas K. Traumatic Brain Injury in the United States: Emergency Department Visits, Hospitalizations, and Deaths. Atlanta, Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 2006
3. Bullock MR, Chesnut R, Ghajar J, Gordon D, Hartl R, Newell DW, *et al*. Surgical management of acute epidural hematomas. Neurosurgery. 2006; 58(3 suppl):S7-15; discussion Si-iv.
4. Murray GD, Butcher I, McHugh GS, *et al*: Multivariable prognostic analysis in traumatic brain injury: results from the IMPACT study. *J Neurotrauma*. 2007; 24: pp. 329-337
5. Jennett B, Bond M. Assessment of outcome after severe brain damage. A practical scale. Lancet. 1975;1:480—4

6. M. L. Babu, Sanjay Kumar Bhasin, Adarsh Kumar. Extradural Hematoma - An Experience of 300 Cases. JK SCIENCE. 2005; Vol. 7: No. 4.
7. Mezue WC, Ndubuisi CA, Chikani MC, Achebe DS, Ohaegbulam SC. Traumatic extradural hematoma in Enugu, Nigeria. Niger J Surg. 2012;18:80-4.
8. Mian Iftikhar ul Haq. Traumatic extradural hematoma. Professional MED J. 2014; 21(3): 540-543.
9. Lai Rehman, Azmatullah Khattak, Aamer Naseer, Mushtaq. Outcome of acute traumatic extradural hematoma. *J Coll Physicians Surg Pak* .2008 Dec;18(12):759-62.
10. Cheung PS, Lam JM, Yeung JH, Graham CA, Rainer TH. Outcome of traumatic extradural haematoma in Hong Kong. Injury. 2007;38(1):76-80.
11. Islam MJ1, Saha SK2, Elahy MF3, Islam KMT4, Ahamed SU5. Factors influencing the outcome of patients with acute extradural haematomas undergonig surgery. *Bangladesh Journal of Medical Science 2011 April*; Vol.10 :No.2 .
12. Ümit Özkan*, Serdar Kemaloğlu*, Mustafa Özateş**, Aslan Güzel*, Mehmet Tatlı. Analyzing Extradural Haematomas: A Retrospective Clinical Investigation. Dicle Tıp Dergisi, 2007; Cilt: 34, Sayı: 1, (14-19).
13. Khan MB, Riaz M, Javed G, Hashmi FA, Sanaullah M, Ahmed SI. Surgical management of traumatic extra dural hematoma in children: Experiences and analysis from 24 consecutively treated patients in a developing country. Surg Neurol Int. 2013;4:103.

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