



RESEARCH ARTICLE

ANALYSIS OF CLINICORADIOLOGICAL PROGNOSTIC FACTORS IN TRAUMATIC ACUTE SUBDURAL HEMATOMAS

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ABSTRACT

Subdural hematoma is formed when bleeding occurs in subdural space. Subdural hematoma may be acute, sub-acute or chronic. Post traumatic acute subdural hematoma is one of the most lethal of all head injuries. It is one of the most difficult tasks faced by neurosurgeons because of high mortality and morbidity of this disease. Many factors affect the outcome of post traumatic acute subdural hematoma (1). Factors found to provide most of the prognostic information include patient's age (2) Glasgow coma score (3), abnormality in pupillary reaction, direct admission of patient to trauma centre and computed tomography scanning. Outcome of patients is noted by Glasgow outcome score (4). The present study assesses the burden of post traumatic acute subdural hematoma and identifies factors influencing its outcome at tertiary care teaching hospital in Rajasthan. It is a clinical, radiological and management based study of patients of post traumatic acute subdural hematoma who presented to PBM and associated group of Hospitals, Bikaner from Dec 2014 to Dec 2015.

INTRODUCTION

PTASH has been recognized as a devastating injury and a major public health problem. Incidence of PTASH is rapidly increasing in the world, especially in developing countries. SDH is formed when bleeding occurs in subdural space. It has a higher mortality than EDH and is an important cause of death in severely injured patients (5). Death is usually due to brain damage secondary to raised intracranial pressure. Following a review of approximately 3000 cases of head injury, amongst which all fatal cases were submitted to autopsy, Kristiansen and Tandon in 1960 (6) concluded that acute SDH is seldom an isolated lesion. In the present study we have evaluated various factors influencing the outcome of post traumatic acute SDH. The study was conducted on all patients of PTASH admitted in PBM and associated group of hospitals in the Dec 2014 to Dec 2015 period. The outcome and course of recovery after PTASH are important to patients, healthcare professionals, researchers and policy makers.

MATERIAL AND METHODS

This is a prospective study conducted on all trauma patients having acute SDH admitted in department of Neurosurgery, SPMC and associated group of hospitals, Bikaner from Dec 2014 to Dec 2015. The patients in the study group were subjected to detailed history, vital parameters, complete general physical cliniconeurological examination, history of major symptoms, associated injuries, pupillary reaction, Doll's eye reflex, biochemical examination and radiological examination.

Severity of brain injury was assessed by GCS. 15.79% of patients were treated conservatively and 84.21% of patients underwent surgery.

Surgical procedure: Craniotomy with evacuation of the SDH was done.

All subjects were evaluated at time of hospital discharge with GOS.

Observations

Table 1. Distribution of cases according to age and sex incidence

Age Group (Yrs.)	Sex				Total	
	Female		Male		No.	%
	No.	%	No.	%		
<=10	2	3.51	3	5.26	5	8.77
11-20	0	0.00	2	3.51	2	3.51
21-30	2	3.51	7	12.28	9	15.79
31-40	4	7.02	9	12.28	13	22.81
41-50	0	0.00	7	12.28	7	12.28
51-60	1	1.75	5	8.77	6	10.53
61-70	1	1.75	5	8.77	6	10.53
71-80	1	1.75	3	5.26	4	7.02
81-90	3	5.26	0	0.00	3	5.26
>90	1	1.75	1	1.75	2	3.51
Total	15	26.32	42	73.68	57	100

The above table shows that maximum number of patients were in fourth decade of life. The youngest patient was 5 years old and oldest was 94 years old.

Overall male to female ratio was 2.8:1

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Table 2. Distribution of cases according to etiology

Etiology	No. of Cases	Percentage
RTA	47	82.46
Assault	2	3.51
FFH	4	7.02
Others(Hit by Object,H/O Fall etc.)	4	7.02
Total	57	100.00

This table shows that road traffic accident was the commonest cause of PTASH accounting for 82.46% cases followed by fall from height which accounted for 7.02% cases.

Table 3. Distribution of cases according to gcs at the time of admission

GCS Score	No. of cases	Percentage
13-15	7	12.28
9-12	14	24.56
3-8	36	63.15
Total	57	100.00

The above table shows that most of the patients (63.15%) had GCS of 8 or less.

Table 4. Distribution of cases according to associated injuries on nect head

Associated Injury	No. of Cases	Percentage
EDH	1	1.75
SAH	2	3.51
Contusion	5	8.77
ICH	0	0.00
None	49	85.96
Total	57	100.00

The above table shows that extradural hematoma was the associated injury in 1.75% patients, sub arachnoid hematoma was present in 3.51% and contusion was present in 8.77% patients.

Table 5. Distribution of cases according to other organ injuries

Other Injury	No. of Cases	Percentage
Spinal	0	0.00
Dental	3	5.26
Eye	4	7.02
Orthopaedic	10	17.54
Abdominal Injury	0	0.00
Rib Fracture	1	1.75
No other injury	39	68.42
Total	57	100.00

This table shows that the most common of the other injuries were orthopaedic injuries seen in 17.54% patients followed by eye injuries seen in 7.02% patients. Dental injuries were seen in 5.26% and rib fracture in 1.75% patients.

Table 6. Distribution of cases according to mortality in relation to age

Age Group	No. of Cases	Percentage of Total Cases	Mortality	Percentage Mortality
<=10	5	8.77	1	20.00
11-20	2	3.51	1	50.00
21-30	9	15.79	1	11.11
31-40	13	22.81	3	23.07
41-50	7	12.28	2	28.57
51-60	6	10.53	1	16.67
61-70	6	10.53	4	66.67
71-80	4	7.02	1	25.00
81-90	3	5.26	1	33.33
>90	2	3.51	1	50.00
Total	57	100.00	16	28.07

This table depicts mortality pattern according to age. Overall mortality percentage was 28.07%.Mortality percentage was highest in age group of 61-70 years (66.67%) followed by 50% in age groups of 11-20 years and >90 years.

Table 7. Distribution of cases according to mortality in relation to management

Management	No. of Cases	Percentage of Total Cases	No. of Mortality	Percentage of Mortality
Operative	48	84.21	14	29.70
Non-Operative	9	15.79	2	22.22
Total	57	100.00	16	28.07

The table depicts that mortality of operated cases was 29.7% whereas mortality of patients treated conservatively was 22.22%.

Table 8. Distribution of cases according to mortality in relation to gender

Gender	No. of Cases	Percentage of Total Cases	No. of Mortality	Percentage of Mortality
Female	15	26.32	4	26.66
Male	42	73.68	12	28.60
Total	57	100.00	16	28.07

The above table shows that PTASH due to any mode was more common in males than females and actual number of deaths were much higher in males than females (12 v/s 4). However the percentage mortality was not much affected by this. Male: Female mortality percentage was 28.60 v/s 26.66.

Table 9. Distribution of cases according to mortality in relation to gcs at the time of admission

GCS	No. of Cases	Percentage of Total Cases	Mortality	Percentage of Mortality
13-15	7	12.28	0	0
9-12	14	24.56	2	14.28
3-8	36	63.15	14	37.83
Total	57	100.00	16	28.07

Above table depicts that mortality rates were 37.83%, 14.28% and 0% in GCS groups of 3-8, 9-12 and 13-15 respectively.

Table 10. Distribution of cases according to mortality in relation to associated injuries on nect head

Associated Injury	No. of Cases	Percentage of Total Cases	No. of Mortality	Percentage of Mortality
+	8	14.04	3	37.50
-	49	85.96	13	26.53
Total	57	100.00	16	28.07

Table shows that patients with associated injury on NCCT head had a higher mortality rate (37.50%) in comparison to those without associated injury (26.53%).

Table 11. Distribution of cases according to mortality in relation to icu admission

ICU Admission	No. of Cases	Percentage of Total Cases	No. of Mortality	Percentage of Mortality
Yes	19	33.33	11	57.9
No	38	66.67	5	13.2
Total	57	100.00	16	28.07

Table depicts that percentage mortality was 57.9% in patients of PTASH admitted in ICU as compared to 13.2% in patients without ICU admission.

Table 12. Distribution of cases according to glasgow outcome score (gcs)

S. No.	Outcome	No. of Cases	Percentage
1	Death	16	28.07
2	Persistent Vegetative	7	12.28
3	Severe Disability	10	17.54
4	Moderate Disability	1	1.75
5	Good Recovery	23	40.35
	Total	57	100.00

The table depicts that 42.10% patients had favorable outcome (GOS 4-5) while 57.89% patients had unfavorable outcome (GOS 1-3).

Table 13. Distribution of cases according to mortality in relation to doll's eye reflex

Doll's Eye Reflex	No. of Cases	Percentage of Total Cases	Number of Deaths	Percentage
+	51	89.47	11	21.60
-	6	10.53	5	83.33
Total	57	100.00	16	28.07

Above table depicts that patients with absent Doll's eye reflex had much higher mortality as compared to patients with positive Doll's eye reflex.

Table 14. Distribution of cases according to mortality in relation to drug/alcohol intoxication

Intoxication	No. of Cases	Percentage of Total Cases	No. of Deaths	Percentage
+	14	24.56	5	35.7
-	43	75.44	11	25.6
Total	57	100.00	16	28.07

The table shows that the mortality percentage was higher in patients with intoxication as compared to patients who were not under the effect of drug/alcohol.

Table 15. Distribution of cases according to mortality in relation to side of ptash

Side	No. of Cases	Percentage of Total Cases	No. of Deaths	Percentage
Left	36	63.16	13	36.10
Right	21	36.84	3	14.30
Total	57	100.00	16	28.07

This table depicts that death rate of left sided PTASH was more than that of right sided PTASH in our series.

DISCUSSION

In our study we have analyzed various factors which influence the prognosis of PTASH. In the study group, the age of patients ranged from 5-94 years with a median age of 40 years and highest incidence was in 4th decade. Yatoo and Tabish (7) in 2008 did a study in which age ranged from 6 months to 80 years and maximum incidence was in 3rd decade of life. In present study overall male to female ratio was 2.8:1, in the age group of <10 years ratio was 1.5:1. Percentage mortality was more in males than females. Yatoo and Tabish (7) found overall male to female ratio of 3:1 and found that head injury related deaths were more in males than females. In our study, percentage mortality was highest in age group of 61-70 years followed by 11-20 years and >90 years. Mortality in age group of <60 years was lower than in age of >60 years. Howard *et al*

(8) reported that overall mortality was more than 4 times higher in patients of >65 years age than in age group of 18-40 years. Hukkelhoven *et al* (2) estimated that odds for poor outcome increased by 40-50% per 10 years of age. In study of Koc *et al*(9) the findings demonstrated that older age was associated with increased mortality. According to retrospective study in NIMHANS (10), age was significant factor determining mortality, overall mortality was highest (55%) in patients aged >60 years. In our study the commonest mode of injury was RTA followed by fall from height and assault. Yatoo and Tabish (7) in 2008 also found RTA to be commonest mode followed by fall. Odebode and Abubaker (11) in 2004 found that RTA was commonest mode of PTASH followed by falls in <16 years age. In present study, drug/alcohol intoxication was found to be associated with increased mortality. Gururaj *et al* (12) in 2005 found that patients under influence of alcohol were more prone to RTA, falls and injury in violent act. In our study, patients with absent Doll's eye reflex had increased mortality. Pillai *et al* (13) in 2003 found that most important predictors of poor outcome were horizontal oculocephalic reflex, motor score of GCS and midline shift on CT-Scan. GCS is a scoring system used to describe level of consciousness following brain injury and is good predictor of outcome. Since its introduction in 1974 by Teasdale and Jennett (14), GCS has become the most widely used standardized method for assessing severity of head injury.

Glasgow Coma Scale:

Best eye response:Score

- No eye opening 1
- Opens eyes to pain 2
- Opens eyes to verbal command 3
- Spontaneous eye opening 4

Best verbal response:

- No sounds 1
- Incomprehensible sounds 2
- Inappropriate words 3
- Confused conversation 4
- Well oriented speech 5

Best motor response:

- No movement 1
- Abnormal Extensor response 2
- Abnormal Flexor response 3
- Withdraws to pain 4
- Localizes to pain 5
- Obeys commands 6

The best GCS score is 15/15 and the worst possible score is 3/15.

Detailed analysis of effects of GCS on outcome was done in the IMPACT (International mission for prognosis and analysis of clinical trials in traumatic brain injuries) study (15).It was shown that GCS score at hospital admission was strongly related to GOS score at 6 months after trauma. Our study depicts that mortality of GCS <8 was 37.83%, 9-12 was 14.28% and 13-15 was 0%. Hatashita *et al* (16) also found strong co-relation between GCS and mortality. Gennarali *et al* (17) also published mortality rates of 74% for patients with acute SDH having GCS score of 3-5 and 36% for GCS of 6-8. Koc *et al* (9) also found similar correlation of mortality with GCS score. In our study, 84.21% patients required surgical

intervention with a mortality of 29.70 % whereas 15.79% patients were managed conservatively and had a mortality of 22.22%. The percentage mortality of patients requiring ICU admission was 57.90% in contrast to 13.20% mortality in patients admitted in neurosurgery ward. The reason for this is that most patients admitted to ICU had severe injury with GCS<8 and thus the outcome was poor. Patients having other associated pathologies on NCCT head and the patients having other organ injuries along with PTASH had higher mortality rates. In our study, 42.10% patients had favorable outcome (GOS 4-5) while 57.89% had unfavorable outcome (GOS 1-3). Koc *et al* (9) reported 60% mortality in their study.

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