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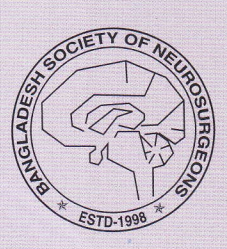

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Original Article

Comparative Analysis of the Surgical Outcome of Traumatic Acute Subdural Haematoma with Associated and not Associated Underlying Brain Injury

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Abstract:

Background: *Acute subdural haematoma is haematoma within the dura & arachnoid mater presenting within 72 hours of injury. It is caused by high speed impact that accelerates the brain relative to the fixed dural structure tearing the bridging veins that traverse between the cortical surface & venous sinuses. The indication of surgical management was maximum thickness of haematoma > 5 mm & > 5mm midline shifting in CT scan of brain.*

Objective: *The study was done to compare the outcome of surgical treatment of traumatic acute subdural haematoma of those who have associated with underlying brain injury with those who have no underlying brain injury.*

Methodology: *This is a prospective study. A total 26 patients of traumatic acute subdural haematoma were selected. Patients are divided into 2 groups according to CT scan of brain findings such as Group I: Those who have no underlying brain injury. Group II: Those who have underlying brain injury. Functional recovery associated morbidity & mortality were assessed & recorded in every case as per Glasgow outcome scale (GOS) and comparative analysis were done between two groups.*

Results: *The result of this study from Chi-Square Test shows that p value is <.001. That indicates prognosis is directly related with underlying brain injury. That is, prognosis is worse when there is associated underlying brain injury.*

Key Words: *Traumatic acute subdural haematoma, CT scan, Underlying brain injury, Glasgow outcome scale.*

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Introduction:

Head injury is one of the most common causes of death in the world. Acute subdural haematoma is much more common in traumatic head injury. Acute subdural haematoma is haematoma within the dura & arachnoid mater presenting within 72 hours of injury. In case of severe head injury about 30% patients suffers from acute subdural haematoma[1]. In United States trauma in the 3rd most common cause of death. More than half of trauma related death is from head injury. Head injury therefore accounts for approximately 80000 death per year in United States & estimated to be 180-220 per 100,000 people per year with a total of 500,000 people suffers from head injury every year[2]. In our country there is no such epidemiological statistics but due to gradual urbanization & industrialization of our country RTA in increasing every day. Acute subdural haematoma found about 2% of admitted head trauma patients, which is about double of the incidence of extradural haematoma. In case of severe head injury the incidence of acute subdural haematoma is about 30% [1]. Mortality of acute subdural haematoma is about 50-90%, patients operated within 4 hrs of injury had 30% mortality; compared to 90% mortality if surgery was delayed more than 4 hrs[3]. A significant percentage of that mortality was from the underlying brain injury & not due to the acute subdural haematoma itself. According to Rangachary S.S, 1994, underlying brain damage in acute subdural haematoma usually much more higher than for acute exrtradural haematoma. Mortality was around 60% & can be lowered by very

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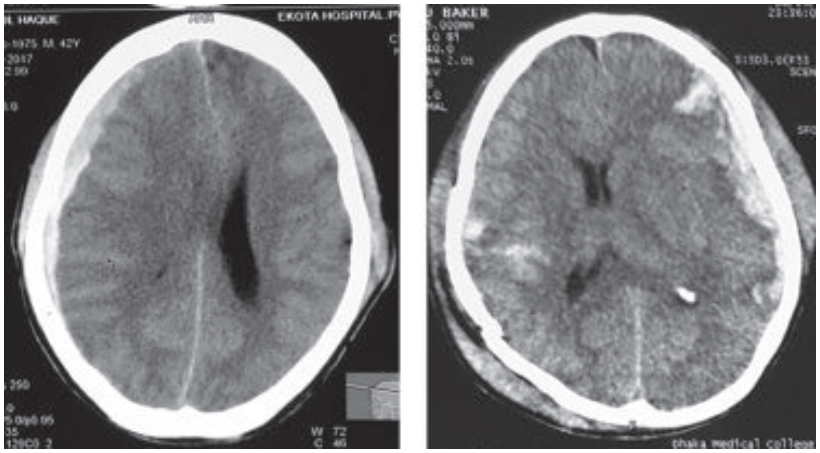
rapid surgical intervention & aggressive medical management. The aim of the study was to evaluate outcome following surgical management of acute subdural haematoma with our limited resources & to find out a plan for management of these patient to reduce mortality & morbidity within a acceptable limit. We also try to evaluate how much the underlying brain damage is responsible for the outcome.

Acute Subdural Haematoma caused by high speed impact that accelerates the brain relative to the fixed dural structure tearing the bridging veins that traverse between the cortical surface & venous sinuses. It can occur due to brain laceration where it is associated with intracerebral contusion & haemorrhage. The clinical presentation of Acute Subdural Haematoma depends on the size of the haematomas & degree of associated parenchymal brain injury. Indication for surgical management includes- in CT scan maximum thickness of haematoma is > 5mm, Midline shifting is >5 mm, Gradual neurological worsening[1]. The goals of the operative procedure are to decompress the brain at the earliest opportunity, evacuate most of the heamatoma, reverse brain herniation & secure adequate haemostasis. Adequate controll of post-operative intracranial pressure is the utmost importance in these patients & dramatically influences outcome.

It is a general believe that delays in surgical decompression & evacuation of Acute Subdural Haematoma significantly contribute to poor outcome. A marked decrease in mortality & morbidity rates in those patients with Acute Subdural Haematoma undergoing craniotomy with evacuation of the haematoma within 4 hours of injury; 30% of the patient died & 65% had functional recovery. However, when surgery was delayed for more than 4 hours post injury, the mortality rate increased to 85% & only 7% of the patient had functional recovery[4]. It also documented that when the interval between the injury & the operation exceeds 2hrs, the mortality rose from 47 to 80%[5].

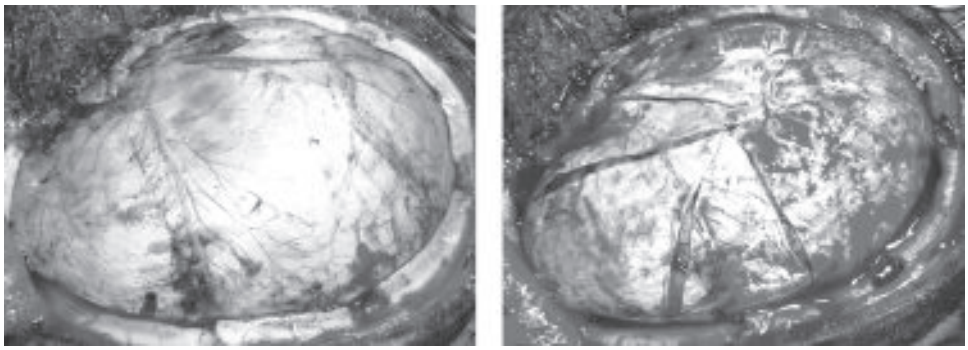
Materials & Methods:

This is a prospective study. The study was carried out in the Neurosurgery Department of Dhaka Medical



(a) (b)

Fig.-1: *CT Scan of the brain showing acute subdural haematoma without underlying brain injury (a) and with underlying brain injury (b).*



(a) (b)

Fig.-2: *Per operative picture of acute subdural haematoma (a) bluish dura indicates underlying haematoma and (b) after durotomy.*

College Hospital, Dhaka. The study was conducted from July 2003 to June 2005. A total 26 patients of Traumatic Acute Subdural Haematoma were selected randomly. All the cases were diagnosed with History, Clinical examination & Radiologically by non-contrast CT scan of the Brain. The criteria for surgical management was maximum thickness of haematoma > 5 mm & > 5mm midline shifting in CT scan of brain. Acute Subdural Haematoma due to other than traumatic causes (example bleeding disorder) and Head injury patient with associated extradural haematoma or intracerebral haematoma were excluded from the study. The epidemiological data were recorded. Patients were divided into 2 groups according to CT scan of brain findings. Group I : Those who have no underlying brain injury. Group II: Those who have underlying brain injury. All the patients were treated surgically and the type of operation, operative findings & surgical outcome were recorded. Functional recovery associated morbidity & mortality were assessed & recorded in every case as per Glasgow outcome scale (GOS). The relationship of outcome of Acute Subdural Haematoma following management & during admission analyzed separately with or without underlying brain injury by multivariate analysis (Pearson Chi-square test) & conclusion drawn on the 'p' value at the 5% (<0.5) level of significance.

Results:

In our study, 16 patients were associated with underlying brain injury which was 61.5% of surgical series. Out of those 16, 7 died (43.8%), 2 was in vegetative state (12.5%), 2 was with severe disability (12.5%), moderate disability 1 (6.2%) & good recovery occurs 4 patients (25%). 10 patients were without any underlying brain injury which was 38.5% of surgical series. Out of those 10, 2 died (20%), 1 vegetative state (10%), 1 with severe disability (10%), moderate disability was found in 2 patients (20%) & 40% that is 4 patients recovered well. Out of total 26 of surgical series 9 expired which was 34.6% of surgical series & 8 patients recovered well which was 30.8%. Among rest of the patient 3 was in vegetative state, 3 was with severe disability & 3 was with moderate disability. Outcome was evaluated on the basis of Glasgow Outcome Scale (GOS).

Table-I

Age distribution in study group (n = 26)

Age in year	No of cases	Percentage
<20	4	15.38
21-30	7	26.92
31-40	6	23.07
>40	9	34.61

Table-II

Sex distribution in study group (n=26)

Sex	No of cases	Percentage
Male	18	69.23
Female	8	30.76
Total	26	100

Table-III

Type of underlying brain injury in study group. (n = 26)

Type of injury	No of patients	Percentage
Brain contusion	9	56.25
Intracerebral clot	6	37.50
Infarction	1	6.25
Total	16	100

Table-IV

Prognosis of surgically managed patients (n = 26)

Total no of patients	Death	Vegetative	Severe disability	Moderate disability	Good recovery
ASDH Without brain injury	2	1	1	2	4
ASDH With brain injury	7	2	2	1	4
Total	9	3	3	3	8

For analysis of data vegetative, severe disability & moderate disability is counted as single group as disability.

	Death	Disability	Good recovery	Total
ASDH without brain injury	2	4	4	10
ASDH with brain injury	7	5	4	16
Total	9	9	8	26

Chi-Square Tests:

Pearson Chi-square	X2 value	df	'P' value
	5.99	2	P=.05

Conclusion: p value is .05.

Discussion:

Due to rapid urbanization & industrialization of our country, road traffic accident is increasing day by day. Poor traffic control & lack of awareness of people regarding traffic system, accident is increasing day by day. Trauma is the most important cause of death & head injury is number one in the trauma list. Acute subdural haematoma occur in about 2% of all head traumas[3] & 30% of all severe head injuries[4]. According to different authors underlying brain injury is more common in acute subdural haematoma & morbidity, mortality is higher in underlying brain injury. In this context our study was done to compare the prognosis of traumatic acute subdural haematoma of those who have associated with underlying brain injury with those who have no underlying brain injury. Morbidity and mortality after an intense subdural haematoma are the most common due to mass lesions.[4] This poor result comes about to a great extent from related parenchymal injuries and ensuing intracranial hypertension.[5] Mortality can be lowered by rapid surgical intervention & intensive medical management. This diffuse parenchymal injury correlate strongly with the outcome of the patient. According to Henry H. Schmidek 2000, Rates of mortality & morbidity after an acute subdural haematoma are the highest of all traumatic mass lesions[6,7]. According to Rengachary S.S 1994, the overall mortality rate of patients with a treated ASDH is roughly 50%, but in our series overall mortality is 34.6% (9 out of 26). In our series mortality of associated underlying brain injury group is 43.8% but mortality of without associated underlying brain injury is only 20%. So mortality of associated underlying brain injury is much more higher. In our series overall disability was 9 (34.61%). Disability of associated underlying brain injury group was 5 (31.25% but disability of without associated brain injury group was 20%, So, disability of associated brain injury is also higher. On the other hand overall good recovery was 30.76%, in our series. Good recovery of without associated brain injury was 40% but with underlying brain injury 25%, so good recovery of associated underlying brain injury is worse than without underlying brain injury. Acute Subdural Haematoma significantly contribute to poor outcome. It had been observed that a marked decrease in mortality & morbidity rates in those patients with Acute Subdural Haematoma undergoing craniotomy with evacuation of the haematoma within 4 hours of injury[8,9]. It also documented that when the interval between the injury & the operation exceeds 2 hours, the mortality rise from 47 to 80%[5.10].

Conclusion

The result from Chi-Square Test shows that p value is <.001. That indicates the result is highly significant. So, outcome after surgical treatment of Acute Subdural Haematoma, prognosis is directly related with underlying brain injury. That is, prognosis is worse when there is associated underlying brain injury.

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