Outcome of Conservative Management of Traumatic Acute Subdural Haematoma in Relation to 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. Small Acute Subdural haematoma less than 5 mm thick on axial CT images, without sufficient mass effect to cause shifting of midline less than 5 mm can be managed conservatively.*

***Objective:** The objective of this study is to asses the morbidity & mortality following conservative management of traumatic acute subdural haematoma.*

***Methodology:** A total 40 patients of Traumatic acute subdural haematoma were selected from Neurosurgery Department, Dhaka Medical College Hospital, Dhaka for this study. All the cases were diagnosed with History, Clinical examination & radiologically by non-contrast CT scan of the Brain. The epidemiological data were recorded and categorized in groups based on some medical and physical features. Then all the categorized data were analyzed using Computer based software SPSS program.*

***Result:** 40 patients were managed conservatively. Among them 30 were not associated with underlying brain injury and 10 were associated with underlying brain injury. In our series mortality of associated underlying brain injury group is 50% but mortality of without associated underlying brain injury is 6.6% and morbidity of associated underlying brain injury group was 40% but disability of without associated brain injury group was 13.33%,*

***Conclusion:** Outcome of conservative management of Traumatic Acute Subdural Haematoma is directly related with underlying brain injury. That is, outcome is worse when there is associated underlying brain injury.*

***Key Words:** Acute Subdural Haematoma, conservative treatment, Morbidity, Mortality.*

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Introduction:

Head injury is the most common cause of death in the world. Acute subdural haematoma is much more common which approximately 30% of all severe head injuries[1]. In our country there is no such epidemiological statistics but report of the Bangladesh Bureau of Statistics, 2001 identifies RTA with head injury as one of the major causes of death[6]. According to the records of two main neurosurgical centers of Bangladesh DMCH & BSMMU 12000-15000 head injury patients get admission every year & the number is increasing day by day. 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. Acute Subdural Haematoma can result from injury to surface of brain with bleeding from cortical vessels into subdural space. In a general series mortality is around 60% in acute subdural haematoma but can be lowered by very rapid surgical intervention & aggressive medical management. Seelig et al, observed a marked decrease is mortality & morbidity rates in those patients with acute subdural haematoma undergoing craniotomy with evacuation

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of haematoma within 4 hours of injury; 30% of the patient died & 65% had functional recovery[2]. However when surgery was delayed for more than 4 hours post injury, the mortality rate increase to 85% & only 7% of the patients had functional recovery[11,13]. Haselberger et al, documented that when the interval between the injury & operation exceeded 2 hours, the mortality rise from 47 to 80%[3]. According to Henry H. Schmidek, MD, FACS, 2000, acute subdural haematoma form against a broad spectrum of primary brain injury of diffuse axonal type[4]. According to Tom Scaletta et al January 2005, all patients of acute subdural haematoma with GCS score less than 12 should be managed in ICU (Intensive Care Unit) with endotracheal intubation[5]. But in our series it was not possible to manage all patients GCS less than 12 in ICU due to limited ICU facilities. We have managed in ICU, all patients GCS less than 9, with severe respiratory distress & falling blood O2 level with endotracheal intubations. Conservative management includes anticonvulsant, diuretics, maintain fluid & electrolyte balance, antibiotics and other supportive treatment were not taken in ICU in our present study[7,8,9]. This study tried to find out a plan for management of these patients to reduce mortality & morbidity within an acceptable limit.

Methodology

This is a prospective study. A total 40 patients of Traumatic Acute Subdural Haematoma were selected randomly from Neurosurgery Department, Dhaka Medical College Hospital, Dhaka from July 2005 to June 2007. All the cases were diagnosed with History, Clinical examination & Radiologically by non contrast CT scan of the Brain. The epidemiological data were recorded. Functional recovery associated morbidity & mortality were assessed & recorded in every case as per Glasgow outcome scale (GOS). The collected data was edited, compiled & statistical analysis was done. The data were presented in tables & graphs. In our series 40 patients were managed conservatively. 35 of them was radiologically indicated for conservative management & rest 5 was managed conservatively either due to refusal of surgery or patient was not physically fit for surgical management. On the basis of type of conservatively management of patients some Criteria were followed such as in CT scan of Brain shows maximum thickness of acute subdural haematoma is less than 5 mm, little or no midline shifting (Fig. 1), refusal of surgical management by the attendants, patient is not physically fit for surgery.

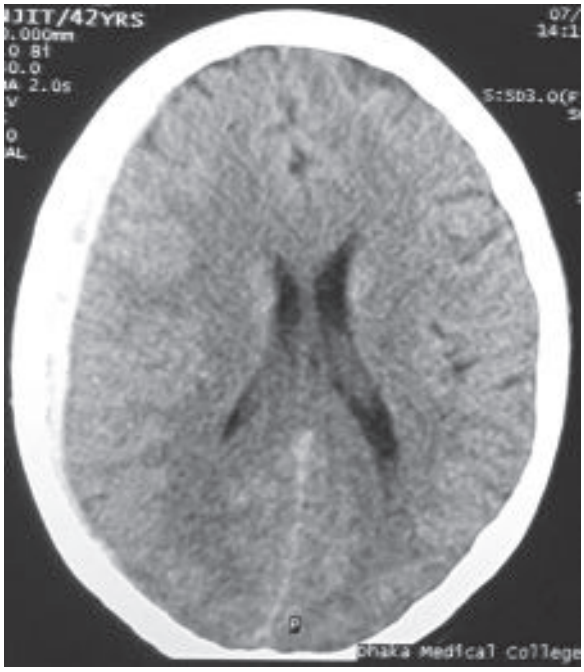

Fig.-1: *CT Scan of the brain axial view showing acute subdural haematoma (Right) less than 5 mm without midline shifting.*

Result:

In our study highest number of patient were in the most active period of life, 70% patients that is 28 patients out of 40 patients were found between 21 to 40 years of age. Below 20 years of age 5 cases (12.5%) were found & 7 cases (17.5%) were found above 40 years of age (Table I).

Table-I

Age distribution in study group (n = 40)

Age in year	No of cases	%
<20	5	12.5
21-30	13	32.5
31-40	15	37.5
>40	7	17.5
Total	40	100

Out of 40 patients in our study 32 cases (80%) were male & only 20% (8 cases) were female. The number of occurrence of brain injury was approximately four times higher in male than in female (Table-2).

Table-II

Sex distribution in study group (n=40)

Sex	No of cases	%
Male	32	80
Female	8	20
Total	40	100

Highest numbers of head injury were found due to road traffic accident which was 50% (20 cases). Next to road traffic accident 2nd highest causes of head injury was fall from height which was 25% (10 cases) & 7 cases were due to assault (17.5%).

Table-III

Incidence of underlying brain injury according to mode of injury

Mode of injury	ASDH without Brain Injury		ASDH with Brain Injury	
	No.	%	No.	%
RTA	16	53.33	4	40
Fall from height	7	23.33	3	30
Assault	5	16.66	2	20
Others	2	6.66	1	10
Total	30		10	

CT scan of Brain done in all 40 (100%) cases, as CT scan in the investigation of choice for its high sensitivity & specificity. Plain X-ray skull (B/V) done in 32 cases (80%). Random Blood Sugar, S. Electrolytes & Blood gases analysis was done in some selective cases, according to need but not included in this study.

Out of 40, 10 patient of associated underlying brain injury, highest incidence of brain injury was underlying brain contusion which was 60% cases (6 patients). 3 patients had associated intracerebral clot which was about 30% & associated infarction was found in 1 patient (10%) (Table-4).

Table-IV

Type of underlying brain injury in study group (n = 10)

Type of injury	No of patients	%
Brain contusion	6	60
Intracerebral clot	3	30
Infarction	1	10
Total	10	100

So, in conservatively managed group of patient, prognosis is directly related with underlying brain injury. That is, prognosis is worse when there is associated underlying brain injury.

Table-V

Follow up of the conservatively managed patients as Glasgow Outcome Scale (n = 40)

Total no of patients		Death		Vegetative		Severe disability		Moderate disability		Good recovery	
		No.	%	No	%	No	%	No	%	No	%
ASDH Without brain injury	30	2	6.6	1	3.3	0	0	3	10	24	80
ASDH With brain injury	10	5	50	1	10	1	10	2	20	1	10
Total	40	7		2		1		5		25	

Table-VI

Outcome of conservative treatment (n = 40)

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

ASDH	Death	Disability	Good recovery	Number
Without brain injury	2	4	24	30
With brain injury	5	4	1	10
Total	7	8	25	40

Chi-Square Tests:

	x^2	df	p value
Pearson Chi-square	22.14	2	p<.001

Discussion:

Acute subdural haematoma is a neurosurgical emergency worrying the surgeon with its malignant behavior. High mortality & morbidity of patients following acute subdural haematoma has led to search for better treatment modalities[10]. In advanced world despite of rapid transportation, emergency medical services, and improved radio imaging acute subdural haematoma continue to contribute significantly poor outcome is severely head injured patients.

Outcome of the conservative treatment was evaluated on the basis of Glasgow Outcome Scale (GOS)[12]. 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 17.5% (7 out of 40). In our series mortality of associated underlying brain injury group is 50% but mortality of without associated underlying brain injury is 6.6%. So mortality of associated underlying brain injury is much more higher. In our series overall disability was 20%. Disability of associated underlying brain injury group was 40% but disability of without associated brain injury group was 13.33%, So, disability of associated brain injury is also higher. On the other hand overall good recovery was 62.5%, in our series. Good recovery of without associated brain injury was 80% but with underlying brain injury 10%, so good recovery of associated underlying brain injury is worse than without underlying brain injury.

Morbidity & mortality following acute subdural haematoma is still much more higher. Mortality can be lowered by rapid surgical intervention & intensive medical management. According to Kotwica 1993, an acute subdural haematoma commonly is associated with extensive primary brain injury11. 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 lesions4. The poor outcome results largely from associated parenchymal injuries & subsequent intracranial hypertension. Approximately 50% of patients have associated lesions, but in our series associated underlying brain injury was 25% (10, out of 40). So, according to different authors underlying brain injury is more common in acute subdural haematoma & morbidity, mortality is higher in underlying brain injury.

Conclusion:

Outcome of Traumatic acute subdural haematoma depends on underlying brain injury. Our study revealed that both mortality and morbidity are higher in traumatic acute sub dural haematoma with underlying brain injury than without underlying brain injury after conservative management.

Reference:

1. Ramamurthy B, Tandon P.N. Extradural haematomas: Textbook of Neurosurgery: 2nd ed; Churchill Livingstone; 1996; vol (1).
2. Seelig JM, Becker DP, Miller JD, Miller JD, et al. Traumatic acute subdural haematoma. Major mortality reduction in comatose patients treated within four hours. N Engl J Med 1981:304:1511-1512.
3. Haselsberger K, Pucher R, Auer LM, Prognosis after acute subdural or epidural haemorrhage. Acta Neurochir (Wien) 1988; 90: 111–116
4. Henry H. Schmidek, MD, FACS, Operative Neurosurgical Technigues Fourth Edition Volume 1-2 Cilt, 2000
5. Scaletta, Tom. "Subdural Hematoma," *eMedicine Medical Library*, January, 2005.
6. Ahmed R, Hossain MA: Craniocerebral Trauma; Epidemiology & Aetiology. Bangladesh Journal of neuroscience 1989, 5:66-75.
7. Becker DP, Miller JD, Young HF, et al. Diagnosis and treatment of head injury in adults. In Youmans LR (ed): Neurological Surgery. Philadelphia; Sauders, 1982, pp 1938-2083.
8. Greenberg M.S: Hand of neurosurgery 4th ed; 1997, Inc vol. 11, pp 729-31.
9. Lindsay KW : Neurology & Neurosurgery Illustrated, 3rd ed, 1997, p 215.
10. Rengachary SS: Principles of Neurosurgery 1994, 4th ed, p-1.2, 1.22, 16.5, 19.4, 19.5.
11. Seelig JM, Becker DP, Miller JD, Miller JD, et al. Traumatic acute subdural haematoma. Major mortality reduction in comatose patients treated within four hours. N Engl J Med 1981:304:1511-1512.
12. Servadei F: Prognostic factors in severely head injured adult patients with acute subdural haematomas. Acta Neurochir (Wien) 1997; 139(4): 279-85.
13. Wilberger JE Jr, Harris M, Diamond DL: Acute subdural hematoma: morbidity and mortality related to timing of operative intervention. J Trauma 1990 Jun; 30(6): 733-6.