

Study on clinical features and factors associated with thickness of chronic subdural hematoma in adult

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Abstract

Patients with chronic subdural hematoma encounter certain difficulties in diagnosis, especially in elderly, due to the characteristically non-specific symptoms and signs. Early diagnosis and proper operative treatment, on the other hand, results in complete recovery in most of the cases. In this study, the clinical features and factors of 31 patients with chronic subdural hematoma, associated with the thickness of chronic subdural hematoma were analyzed. The mean age was 62 ± 13.9 years. The maximum hematoma thickness in the axial CT scan was 25 mm. The thickness of hematoma obtained from axial plain CT had a positive relationship with the patient's age where $r=0.895$ and $p<0.001$ signifies that the thickness of hematoma increased with the increasing age. But the hematoma thickness was not related to co-morbidity such as diabetes mellitus, hypertension and ischemic heart disease. The presentation of the patient with higher hematoma thickness with hemiparesis was statistically significant and with lower thickness with headache and vomiting.

Introduction

The chronic subdural hematoma is relatively common and its outcome without operative treatment is almost invariably fatal. Early diagnosis and proper operative treatment, on the other hand, result in complete recovery in most of the cases. Unfortunately, one encounters certain difficulties in the diagnosis, especially in the elderly patient, due to the characteristically non-specific symptoms and signs.^{1,3} In these studies, the clinical features and factors associated with the thickness of chronic subdural hematoma were analyzed. The relationship of the thickness of hematoma with the clinical findings and other related factors are analyzed in the adult patient with the chronic subdural hematoma.

The chronic subdural hematoma occurs most frequently from a tearing of bridging veins between the cerebral cortex and the draining sinuses. However, they can also be associated with laceration of the brain surface or substance.⁴

The chronic subdural hematoma can be diagnosed with a computed tomography (CT) or magnetic resonance imaging (MRI) scan. CT is currently the investigation of choice in the chronic subdural hematoma.⁵

Hematoma thickness tends to be larger in the older patient due to a decrease in brain weight

and increase in subdural space with age.⁶

The observation that older patient has a longer time interval from the trauma to the operation and that the hematoma is thicker at the time of CT scan than that in young person seem to be a logical result of the changes that occur in the aging brain. During the age interval between 50 and 80 years, the weight of the brain decreases about 200 g and space between the brain and skull increases from 6 to 11% of the total intracranial space. This age-dependent change offers greater space for a hematoma to expand without increasing the intracranial pressure.⁷

The greater prevalence of headache and papilloedema in younger age group despite a smaller average thickness of the hematoma probably arises from the same age-dependent change in the brain weight and intracranial free space. Hemiparesis and other pyramidal tract signs are more common in the aged. This might have been due to the greater volume of hematoma compressing the motor cortex, and could, thus, be compared with meningioma causing external compression of the hemisphere sufficient to result in sensory-motor symptoms and signs but not necessarily increase in intracranial pressure.²

The fact that, by definition, there is a latent period between the moment the brain injury, usually minor, occurs and the appearance of



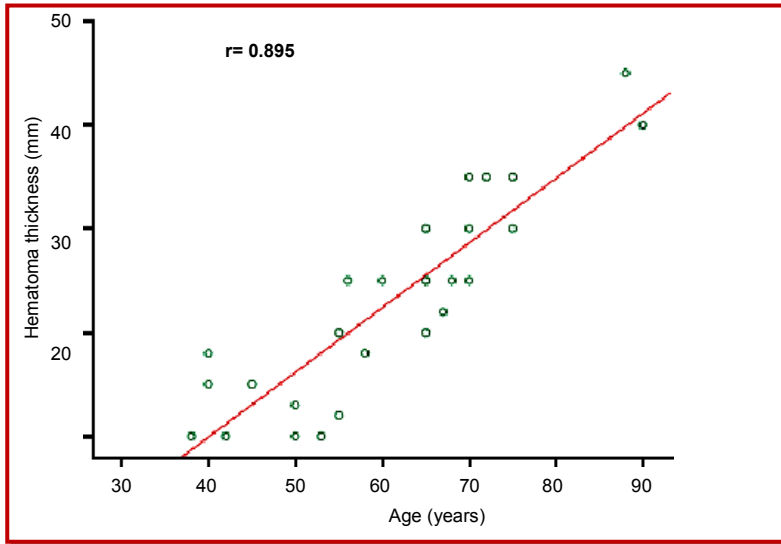


Figure 1: Correlation of age with hematoma thickness

clinical symptomatology, frequently makes the trauma be ignored, thus complicating the diagnosis and most of the times delaying the application of the adequate treatment.

Developing slowly in time, in weeks or months, the aspect that chronic subdural hematoma usually occurs in elder should not be neglected, its clinical symptomatology often debuting with memory and attention disorders, so that the patient is usually referred to the psychiatrist or neurologist, only a paraclinical investigation (CT scan or MRI) being able to establish the diagnosis.⁹

Some patients may be neglected due to the presentation with non-specific symptoms and signs. Some patients present to us with mild symptoms and are neurologically intact having a significant amount of subdural hematoma needs definitive surgical intervention. Some patients need early intervention even in a smaller hematoma thickness, as their presentations are aggressive than the other patients.

This study will help the neurosurgeon of our country in a proper understanding of the clinico-radiological presentations and management of chronic subdural hematoma.

Materials and Methods

The study was carried out from May 2014 to November 2015. The study population was recruited from Bangabandhu Sheikh Mujib Medical University, Dhaka Medical College Hospital and some other private hospitals where neurosurgical facilities were available.

In total 31 patients who fulfilled the selection criteria were enrolled in this study. The data from the case histories concerning craniocerebral trauma, as

well as the presenting symptoms and signs were extracted. The time interval from the trauma to admission was calculated. Maximum linear thickness of the hematoma in millimeters as shown on axial CT scan was recorded.

Statistical analysis

Data were analyzed using SPSS version 18.0. Pearson's correlation test was done to see the relation of thickness with age and the time interval from trauma to admission. χ^2 Tests was done to assess the association between thicknesses with the age, sex, diabetes mellitus, hypertension, ischemic heart disease, chronic kidney disease, chronic liver disease and clinical features of chronic subdural hematoma in adults. Median value (25.0) of hematoma thickness was used as a cut-off value of low- and high-thickness of hematoma.

Results

The male female ratio was 5:1 and the mean age was 62.0 ± 13.9 years.

The thickness of hematoma obtained from the axial plain CT had a strong positive relationship with the patient's age where $r=0.895$ and $p<0.001$ signifies that thickness of hematoma increased with the increasing age (Figure 1). But the hematoma thickness was not related to any co-morbidity (e.g. diabetes mellitus, hypertension, ischemic heart disease). The presentation of patient with higher hematoma thickness with hemiparesis was statistically significant and with lower thickness with headache and vomiting. The mean interval from the trauma to admission was 65 days and the thickness had a positive relationship with the interval from the trauma to admission ($p<0.018$).

In this study, the overall clinical presentation of chronic subdural hematoma patients according to the frequency was headache 64.5%, history of head trauma 64.5%, mental symptoms with or without impaired consciousness 58%, hemiparesis 54.8%, altered consciousness level 41.9%, and vomiting 22.6% (Table I). Only 2 patients presented with the seizure.

Table II shows the distribution of patients according to presenting complains in low- and high-thickness of hematoma in chronic subdural hematoma patients. The incidence of headache and vomiting was significantly high in low thickness of hematoma than high thickness of hematoma but hemiparesis was significantly low in low thickness of hematoma. The association was not measured between the hematoma thickness and gait disturbance, blurring of vision, memory disturbance and behavioral change, because this estimation may create a false impression over these relationships.

Table I

Hematoma thickness and presenting complaints

Parameters		
<i>Age in year</i>	Frequency (n=31)	Hematoma thickness (mm; Mean \pm SD)
31 - 40	3	14.3 \pm 4.0
41 - 50	4	12.0 \pm 2.5
51 - 60	7	18.6 \pm 5.8
61 - 70	11	26.1 \pm 4.7
71 - 80	3	33.3 \pm 2.9
81 - 90	3	41.7 \pm 2.9
<i>Presenting complaints</i>		
Headache	20	
Vomiting	7	
Seizure	2	
Blurring of vision	8	
Hemiparesis	17	
Gait disturbance	10	
Mental symptoms/change		
History of walking difficulty(s) in standing up	7	
Memory disturbance	5	
Outburst with altered consciousness	1	
Irrelevant talking/behavioral change with altered consciousness	6	
Altered consciousness level	13	

Table II

Distribution of patients according to presenting complains in low- and high-thickness of hematoma in chronic subdural hematoma

Presenting complains	Hematoma thickness (mm)		p value
	<25 (%)	\geq 25 (%)	
Headache	14/15 (93.3)	6/16 (37.5)	0.001
Vomiting	6/15 (40.0)	1/16 (6.3)	0.025
Seizure	1/15 (6.7)	1/16 (6.3)	0.962
Hemiparesis	5/15 (33.3)	12/16 (75.0)	0.020
Mental symptoms/change	10/15 (66.7)	8/16 (50)	0.473
Altered consciousness level	6/15 (40.0)	7/16 (43.8)	0.883

Chi-square test was done to measure the level of significance

Discussion

The highest incidence of chronic subdural hematoma was in between 61-70 years (35.5%). This did not correspond to the study of Stanisic et al. (2014)⁸

where the mean patient age was 72.1 and the age range was between 60-85 years. We found that males were predominant than the females, which corresponds to other studies done on chronic subdural hematoma in the adult. Low- and high-thickness of hematoma have no relation with the sex variation. We also found that the thickness of the chronic subdural hematoma has no relation with any co-morbidity. Our observation is that the thickness of the hematoma has a positive linear correlation with age of patient where correlation coefficient is $r=0.895$ and $p<0.001$, which is statistically significant. Another observation is that the patient who is younger and having lower hematoma thickness present with headache and vomiting, here p values are 0.001, and 0.025. On the other hand, the patient who is elder has a higher thickness of hematoma and present with hemiparesis, here p value is 0.020. The thickness of hematoma has no relation to the presence or absence of history of head trauma. But the time interval from trauma to admission in the hospital was higher for higher hematoma thickness group that was statistically significant and here p value is 0.018. the mental change and altered consciousness level have no relation to the thickness of hematoma.

In this study, the overall presentation of chronic subdural hematoma patient is the headache, mental symptoms, hemiparesis, altered consciousness level, gait disturbance, blurring of vision, and vomiting. Only 6.5% (2 patients out of 31) presented with the seizure. In this study, 20 patients out of 31 (64.5%) gave the history of previous head trauma, and time interval between trauma to hospital admission was mean 65 days.

We have excluded the bilateral hematoma patients. In the study of Huang et al. (2013),⁹ bilateral convexity hematomas were identified in 25 of 98 chronic subdural hematoma (25.5%). The patients with bilateral lesions had a lower incidence of hemiparesis than those having unilateral lesions ($p=0.004$). The frequency of focal neurological deficits was found to be lesser in patients with bilateral chronic subdural hematoma, and it may confound the diagnosis and delay treatment. To prevent the neurological deterioration resulting from the thicker hematoma, early surgical decompression for bilateral chronic subdural hematoma should be implemented.

Patients with chronic subdural hematoma can be asymptomatic, have very mild symptoms such as headache, nausea, vomiting, vertigo, fatigue, confusion, gait disturbance, mental deterioration, limb weakness, incontinence, or language difficulties (e.g. word-finding difficulties), or present with acute and grave symptoms such as hemiplegia, seizures, or coma.¹⁰

Moreover, chronic subdural hematoma represents an important cause of dementia and neurological deficits in elders but, fortunately, reversible. The

growth in the clinical susceptibility and the access to paraclinical investigations allow a precocious treatment, which sometimes removes the risk of an unfavorable prognosis.¹¹⁻¹²

In the study of Inao et al. (2001)¹³, 45 patients with unilateral chronic subdural hematoma were grouped into three by the symptoms and signs as follows; headache alone without any neurological deficits (Group I: Headache, n=16), paresis of the limbs without mental changes (Group II: Paresis, n = 14), and mental change with or without paresis (Group III: Mental change, n=15). In Group III, 12 patients were hemiparetic. Mental changes in patients of Group III included consciousness disturbance (delirium, drowsiness, and fluctuating consciousness, which ranged from 9 to 13 on the Glasgow coma scale) and dementia (impairment of memory and intellect with intact sensorium). A history of trauma in the preceding months was elicited in 76% (34/45) of the patients.

Kaste et al. (1979)¹⁴ showed 24 (83%) had a history of head injury, which caused unconsciousness in eight cases. The mean interval from trauma to operation was eleven weeks. The mean age of the patients was 60 years. The prevalence of the most commonly encountered symptoms and signs were: Headache 72%, mental symptoms 48%, papilloedema 41%, vertigo 31%, nausea 28%, reduced consciousness 28%, walking difficulties 24%, hemiparesis 24%, and paraparesis 14%. The aggregate thickness of hematomas was 34, 36 and 40 mm in the age groups of 20-39, 40-59 and over 60 years respectively.¹⁵

Conclusion

Diagnosis of chronic subdural hematoma in a timely fashion gives an excellent result to the surgical outcome. The clinical features of chronic subdural hematoma including hemiparesis, headache and vomiting have a relation with the thickness of hematoma, which has a direct relation with the respective age of the patient.

Ethical Issue

The ethical clearance for the study was taken from the Institutional Review Board, Bangabandhu Sheikh Mujib Medical University.

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