Correlation between Glasgow coma scale on admission and clinical outcome of patients with unilateral chronic subdural hematoma after surgery

K. M. Tarikul Islam, Md. Motasimul Hasan, Sukriti Das, Ehsan Mahmood and Kanak Kanti Barua

Article Info

Department of Neurosurgery, Faculty of Surgery, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka, Bangladesh (KMTI, MMH, KKB); Department of Neurosurgery, Dhaka Medical College, Dhaka, Bangladesh (SD, EM)

For Correspondence:
K. M. Tarikul Islam
dr.tarik_2007@yahoo.com

Received: 30 April 2017
Accepted: 19 May 2017
Available Online: 7 June 2017

ISSN: 2224-7750 (Online)
2074-2908 (Print)

DOI: 10.3329/bsmmuj.v10i2.32711

Cite this article:
Islam KMT, Hasan MM, Das S, Mahmood E, Barua KK. Correlation between glasgow coma scale on admission and clinical outcome of patients with unilateral chronic subdural hematoma after surgery. Bangabandhu Sheikh Mujib Med Univ J. 2017; 10: 115-18.

Available at:
www.banglajol.info

A Journal of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh

Abstract

This study was undertaken to determine the influence of Glasgow coma scale (GCS) on admission on clinical outcome of patients with unilateral chronic subdural hematoma after surgery. A cross-sectional study was conducted on 33 consecutive patients, among them 28 were male, 5 were female with GCS 6 to 15. 19 patients out of 22 who had GCS 14-15 had favorable GOS at 24 hours as compared to 2 out of 7 in GCS 9-13 group and none in GCS ≤8 group. All patients (22 out of 22) had favorable GOS at the time of discharge in GCS 14-15 group while 8 out of 9 had favorable GOS in GCS 9-14 group and 1 out of 2 patients had favorable GOS in GCS ≤8 group. Chi square test showed significant difference in outcome between 14-15, 9-13 and ≤8 GCS groups (p values 0.001, 0.015, 0.013 respectively). In conclusion, clinical outcome of patients with unilateral chronic subdural hematoma depends on Glasgow coma scale on admission.

Introduction

Chronic Subdural Hematoma (CSDH) is defined as the hematoma in the subdural space that is older than 3 weeks.[1] History of head trauma is found in more than 50% of cases and usually occurs in old age with mean age being 63 years.[2] In case where there is no associated trauma other aetiologies have to be considered. Chronic subdural hemaoma is an intracranial lesion with varied symptomatology, etiology, mechanism of progression, pathogenesis, type of management and prognosis. Of all intracranial hematomas the best prognosis is carried by patients with CSDH.[3]

Chronic subdural hematoma is darkish red, liquefied blood and blood breakdown products with an associated neo-membrane and is located in the potential space between dura and arachnoid mater.[4]

Chronic subdural hematoma of the elderly is now considered to be a rather benign entity, ignoring its relative mortality and morbidity. When Virchow first described "Pachymeningitis hemorrhagica interna" it was considered a fatal disorder. Over the past 150 years, a dramatic improvement in outcome was achieved following better understanding of the pathophysiology, the introduction of modern imaging methods and refinements of operative techniques.[5]

Chronic subdural hematoma usually starts with hemorrhage in the subdural space from the bridging veins, because bridging veins have no support in the subdural space.[6] Membrane formation around the hematoma is a characteristic feature of CSDH which is due to non specific inflammatory response of the highly vascular inner dural layer to the presence of blood products, fibrin and fibrin degradation products in the subdural cavity.[7] Repeated micro-hemorrhages from the neocapillary network in the outer membrane or abnormally high vascular permeability is thought to be responsible for hematoma enlargement.[8] There is no change in osmolality of hematoma fluid.[9]

It has been reported to be 1-5.3 cases per 100,000 people per year and is 2 times more common in men. Chronic subdural hematoma induces neurological dysfunction primarily due to mechanical distortion of central brain regions such as thalamus with the secondary influence on remote regions due to transneural depression.[10] According to Weir, Wepfer described CSDH in 1656 (1971). In 1826 Bayle described the pathophysiology of CSH as chronic rebleeding, and in 1850s Ballarger and Heschl proposed the inflammatory reaction in subdural space as the pathophysiological basis of CSDH.[11] In 1840 a case of CSDH, successful neurosurgical treatment of CSDH was first reported by Hulke in 1883.[12] Abbas A et al. has

shown that Glasgow coma scale (GCS) on admission is correlated with postoperative Glasgow outcome scale (GOS) in chronic subdural hematoma.[13] Glasgow coma scale score was categorized into 14-15, 9-13 and ≤8.[14]

Since the invention of Computerized Tomography (CT) scan in 1972 it has established itself as the mainstay of diagnosis of CSHD. In CT scan of the head it typically appears as crescentic iso to hypodense area on the convexity with or without midline shift. Since brain atrophy is more commonly related with increased age, patients of 45 -60 years of age were included in this study which was not done previously in Bangladesh. This study evaluated the correlation between GCS on admission and clinical outcome of patients in terms of GOS with unilateral chronic subdural hematoma after surgery.

Materials and Methods

This is a cross sectional comparative study which was carried out at the department of Neurosurgery, DMCH from July 2008 to June 2009 on 33 consecutive patients with unilateral chronic subdural hematoma and subsequently confirmed by CT scan of head with the age ranged from 45 to 60 years with mean age 53.9 ± 5.6 years. Patients associated with intracranial pathology like space occupying lesion and other known disability or severe systemic disease like chronic renal failure and severe cardiac diseases were excluded from this study. Among 33 patients 28 were male, 5 were female with GCS 6 to 15. All these patients were evaluated on the basis of detailed history from attendants on admission, clinical examination and subsequently confirmed by CT scan of head. All patients were operated (single or double burr hole and evacuation of hematoma with or without drain, with or without rupturing inner membrane) and followed-up at 1st postoperative day, 3rd postoperative day and at the time of discharge by observing GCS and GOS. A pre-designed data collection sheet was used for each patient and information regarding detailed history, general and neurological examination and findings of CT scan (volume, midline shift) were recorded. GCS and GOS were also recorded. Collected data was analyzed by using statistical package for social science (SPSS) software, version 16. Chi-square test was applied to test the significance of differences in different groups. Statistical significance was set up at $p<0.05$ (95% level of significance).

Results

Twenty two patients had GCS in the range of 14-15, 9 (27.3%) had 9-13 and 2 (6%) patients had GCS less than 9 on admission (Table I).

Nineteen patients out of 22 who had GCS 14-15 had favorable GOS at 24 hours as compared to 2 out of 7 in GCS 9-13 group and none in GCS ≤8 group. All patients (22 out of 22) had favorable GOS at the time of discharge in GCS 14-15 group while 8 out of 9 had favorable GOS in GCS 9-14 group and 1 out of 2 patients had favorable GOS in GCS ≤8 group. Chi-square test showed significant difference in outcome between 14-15, 9-13 and ≤8 GCS groups (p values 0.001, 0.015, 0.013 respectively).

At 24 hours following surgery 5 patients had GOS of 5, 16 patients had 4 and 12 patients had 3 (Table II). At 72 hours 16 patients and at the time of discharge 26 patients had GOS 5. One patient had GOS 1, one patient had GOS 3 and 5 patients had GOS 4 at the time of discharge.

Table II

Distribution of patients according to Glasgow outcome scale (GOS)

	Scale				
Time	1	2	3	4	5
24 hours	0	0	12	16	5
72 hours	0	0	6	11	16
Discharge	1	0	1	5	26

Table I

Relation between the Glasgow coma scale on admission and the Glasgow outcome scale

	Glasgow outcome scale					
	24 hours		72 hours		Discharge	
Glasgow coma scale	Favorable (n=21)	Unfavorable (n=12)	Favorable (n=27)	Unfavorable (n=6)	Favorable (n=31)	Unfavorable (n=2)
14-15	19	3	21	1	22	0
9-13	2	7	5	4	8	1
≤8	0	2	1	1	1	1
p value		0.001	0.15		0.013	

63.6% (21) of patients had favorable GOS at 24 hours following surgery which became 93.9% (31) at the time of discharge. Twelve (36.4%) patients had unfavorable GOS at 24 hours, 10 of them improved and only 2 patients had unfavorable outcome at the time of discharge. There is significant difference between GOSs at 24, 72 hours and at the time of discharge (p value 0.008).

Discussion

Mean age of the study subjects was 53.9 ± 5.6 years which is comparable to other study where mean age was 67.7 years.[15] Kansal et al. found that mean age of the patient with chronic subdural hematoma was 48 years which is similar to my study.[16] About 50% of patients had GOS 4 at 24 hours. 19 out of 33 patients in GCS group 14 to 15 had favourable outcome at 24 hours. At discharge all the patients in GCS group 14-15 had favourable outcome as compared with 6% (2), patients in rest of two groups who had unfavourable outcome. Co-relation between these subgroups of GCS (14-15, 9-13 and ≤ 8) and GOS (favourable 4, 5 and unfavorable 1, 2, 3) was done at 24, 72 hours and at the time of discharge which was found significant implying that clinical outcome of patients with unilateral chronic subdural hematoma after surgery depends on Glasgow coma scale on admission which is similar to other study.[13]

For analysis GOS was dichotomized into favorable (GOS 4 and 5) and unfavorable (GOS 1, 2 and 3) groups.[17]

One patient expired on post-operative day 2. She was using clopidogrel and aspirin for cardiac problems. These drugs were held for 3 days and surgery was done as the patient was deteriorating neurologically. She developed acute subdural hematoma post-operatively which was evacuated, however she did not recover and expired.

Use of antiplatelet drugs was not considered as the limiting factor in this study because these drugs were routinely stopped at least 7 days before the operation except in one case which expired post-operatively. In one patient fresh frozen plasma and platelet rich plasma was infused to normalize the bleeding profile (PT, APTT). Stopping these drugs for at least 7 days made these patients equivalent to the general population who were not using antiplatelet agents.

Conclusion

There was statistically significant correlation between GCS on admission and clinical outcome in patients with unilateral chronic subdural hematoma after surgery that means post-operative clinical outcome was dependent on Glasgow coma scale on admission. Patients who had low Glasgow outcome scale at 24 hours had statistically significant improvement in GOS at the time of discharge.

References

1. Vilela M, West GA. Traumatic intracranial hematoma. In: Principles of neurosurgery. Rengacharya SS, Ellenbogen RG (eds). 2nd ed. Philadelphia, Elsevier, 2008, pp 362-64.
2. Greenberg MS (ed.). Head trauma. In: Handbook of neurosurgery. 7th ed. New York, Thieme Medical Publishers, 2010, pp 899-902.
3. Ramamurthi B, Tondon PN (eds.). Chronic subdural hematoma. In: Textbook of neurosurgery. 2nd ed. New Delhi, Churchil Livingstone, 1996, pp 315-29.
4. Uebada PB, Schmidek HH. Surgical management of chronic subdural hematoma in adults. In: Operative neurosurgical techniques indications, methods and results. Schimdek HH, Roberts DW (eds). 5th ed. Philadelphia, Saunders, 2006, pp 81-88.
5. Weigel R, Schmiedek P, Krauss JK. Outcome of contemporary surgery for chronic subdural hematoma: Evidence based review. J Neurol Neurosurg Psychiatry. 2003; 74: 937-43.
6. Zwienenberg-Lee M, Muizelaar JP. Clinical pathophysiology in traumatic brain injury. In: Youmans neurological surgery. Winn HR (ed). 5th ed. Philadelphia, Saunders, 2004, pp 5039-64.
7. Apefelbaum R, Guthkelch A, Shulman K. Experimental production of subdural hematomas. J Neurosurg. 1974; 40: 336-46.
8. Markwalder TM. Chronic subdural hematomas: A review. J Neurosurg. 1981; 54: 637-45.
9. Weir B. The osmolality of subdural hematoma fluid. J Neurosurg. 1997; 34: 528-33.
10. Tanaka A, Nakayama Y, Yoshinaga S. Cerebral blood flow and intracranial pressure in chronic subdural hematomas. Surg Neurol. 1197; 47: 346-51.
11. Gonzalez MG, Pais MI, Allut AG, Rumbo RM. Chronic subdural hematoma: Surgical treatment and outcome in 1000 cases. Clin Neurol Neurosurg. 2005; 107: 223-29.
12. Weigel R, Krauss JK, Schmiedek P. Concepts of neurosurgical management of chronic subdural hematoma: Historical perspectives. Br J Neurosurg. 2004; 18: 8-18.
13. Abbaas A, Mehdi A, Armin R. Glasgow coma scale on admission is correlated with postoperative Glasgow outcome scale in chronic subdural

hematoma. J Clin Neurosci. 2007; 14: 1240-41.

14. Narayan RK, Kempisty M. Closed head injury. In: Principles of neurosurgery. Rengacharya SS, Ellenbogen RG (eds). 2nd ed. Philadelphia, Elsevier, 2005, pp 302-18.

15. Havenbergh TV, Calenbergh FV, Goffin J, Plests C. Outcome of chronic subdural hematoma: Analysis of prognostic factors. Br J Neurosurg. 1996; 10: 35-39.

16. Kansal R, Nadkarni T, Goel A. Single versus double burr hole drainage of chronic subdural hematoma: a study of 267 cases. J Clin Neurosci. 2010; 17: 428-29.

17. Tesdale GM, Petigrew LEL, Wilson JTL, Murray G and Jennet B. Analyzing outcome of treatment of severe head injury: A review and update on advancing the use of the Glasgow outcome scale. J Neurotrauma. 1998; 15: 587-96.