Original Article

Comparative study between single versus double burr-hole drainage of unilateral chronic subdural haematoma

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Abstract

Chronic subdural haematoma (CSDH) is defined as the haematoma in the subdural space which tend to occur in the elderly several weeks after head injury. The incidence of CSDH varied from 1.72 per 100,000 inhabitants per year in Finland to 13.1 per 100,000 inhabitants per year in Japan with a peak incidence in the sixth and seventh decade of life. CSDH is a common treatable cause of dementia. The principal techniques used in the treatment of CSDHs are presently burr hole, twist drill craniostomy, craniectomy and craniotomy. The aim of this study was to assess clinical outcome in unilateral chronic subdural haematoma psatients treated by single or double burr-hole drainage. This clinical trial was carried out at the department of neurosurgery, BSMMU from June 2010 to November 2011. A total of 40 consecutive patients with their age ranged from 50 to 70 years with GCS 9 to 13 & haematoma volume greater than 30cc were included in this study and randomly divided into two groups. In group A, patients with chronic subdural haematoma (CSDH) were managed with double burr-hole drainage. In group B, patients were managed with single burr-hole drainage. Clinical outcome was measured on the 1st post operative day, 3rd post operative day and at the time of discharge (usually on the 7th post operative day) and at 1 month follow-up by measuring Glassgow coma scale (GCS), improvement of limb weakness and Markwalder grading scale. In this study double burr-hole drainage and single burr-hole drainage surgery shows equal success in the management of CSDHs.

Key words: Chronic subdural haematoma, burr hole, head injury

Introduction

Chronic subdural haematoma (CSDH) is defined as the haematoma in the subdural space which tend to occur in the elderly several weeks after head injury.[1] The incidence of CSDH varied from 1.72 per 100,000 inhabitants per year in Finland to 13.1 per 100,000 inhabitants per year in Japan.[2] It has a peak incidence in the sixth and seventh decade of life. It was estimated that the incidence of 1.72/100 000 per year was increasing steeply with advancing age up to 7.35/100 000 per year in the age group 70-79 years.[3] This incidence is expected to rise further due to the continuing growth of the older population.[1]

CSDH is a common treatable cause of dementia. Some may be derived from subdural hygromas. The presence of brain atrophy or loss of brain tissue due to any cause, such as old age, alcoholism, hydrocephalus or stroke may provide either an increased space between the dura and the brain surface where a subdural hygroma can form due to traction on bridging veins that span the gap between the cortical surface or venous sinuses.[4]

Over the past 150 years, a dramatic improvement in outcomes was achieved following better understanding of the pathophysiology, the introduction of modern imaging method and refinement of operative techniques. However, mortality of up to 13% was reported in the contemporary literature, which might reflect the fact that up to four deaths a year are related to this condition in a typical neurosurgical department.[5]

The principal techniques used in the treatment of CSDHs are presently burr-hole, twist drill craniostomy, craniectomy and craniotomy. The number of treatment options reflects the dilemma of the search for the optimum procedure.[5] Typically, elderly patients are often

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frail and malnourished. The goal of evacuation of haematoma is often to minimize anaesthetic and surgical risks. In the treatment of CSDH, various techniques have been used, including burr-hole craniostomy or twist-drill craniostomy with closed system drainage.[6]

Before the advent of CT scan, craniotomy was performed to evacuate haematoma. Some authors still advocate small craniotomy with or without membranectomy. In India, Sambasivan procedure resulted in marked reduction of CSDHs recurrence and further membranectomy was not required with only 0.5% mortality.[7]

Various aspects of computerized tomography (CT) scan findings like mid-line shift, brain atrophy, haematoma density and location have been investigated.[8] In CT scan of the head, it is typically appears as crescenticiso to hypodense area on the convexity with or without mid-line shift. Mostly located in the fronto-parietal region over convexity but may also occur in the cranial base.

Liquefied chronic subdural haematoma are commonly drained through either single or double burr-hole. There is no report that demonstrates the superiority of double burr holes over a single burr-hole for the treatment of the chronic subdural haematoma.[9] Burr-hole craniotomy with closed drainage achieved a good surgical prognosis as a treatment of chronic subdural haematoma. Burr-hole craniotomy with one burr hole would be sufficient to evacuate chronic subdural haematoma with lower recurrence rate.[10]

Methods

This study was carried out at the department of neurosurgery, BSMMU from June 2010 to November 2011. A total of 40 consecutive patients with their age ranged from 50 to 70 years with GCS 9 to 13 with haematoma volume greater than 30cc were included in this study. All patients were evaluated by history, clinicalexamination and CT scan findings of head (hypodense area, cresentic in shape). Patients were divided into two groups: Group A and Group B. Twenty (20) patients were allocated in each group. In group-A, patients were selected as every subsequent odd case for double burr-hole drainage and in group-B, patients who were selected as a every subsequent even case for single burr-hole drainage. Clinical outcome was measured on the 1st post operative day, 3rd post operative day, at the time of discharge (usually on the 7th post operative day) and at 1 month follow-up by measuring GCS, improvement of limb weakness and Markwalder grading scale (used as prognostic score in chronic subdural haematoma). Data were collected with the help of a structure questionnaire and face to face interview with the attendants of the patients. All relevant data were compiled manually in master data sheet and organized by scientific calculator. Collected data was analyzed by using statistical package for social science (SPSS-16). Chi-square test was applied to test the significance of differences in different groups. Statistical significance was set at $p < 0.05$ at 95% level of confidence interval.

Results

In group A (n=20), before surgery, mean Glasgow Coma Scale (GCS) was 10.45±1.60 (SD) where the range of the GCS was 9-13. In group B (n=20), mean Glasgow Coma Scale (GCS) was 10.75 ± 1.16 (SD) where the range of the GCS was 9-12. So, the difference of mean pre-operative Glasgow Coma Scale (GCS) between the two groups was not statistically significant (p-value >0.50). (Table-I)

In group A (n=20), after surgery, mean Glasgow Coma scale (GCS) was 13.65±0.98 (SD) where the range of the GCS was 12-15. In group B (n=20), mean Glasgow Coma Scale (GCS) was 12.65±3.24 (SD) where the range of the GCS was 11-15. So, in post-operative GCS level, there was no significant difference (p-value >0.05). (Table-II)

Table-I : Comparison of pre-operative Glasgow Coma Scale

Glasgow Coma Scale	Group A	Group B	T value	P value
Mean ± SD	10.45 ±1.60	10.75 ±1.16	0.67	0.50
Range	9 - 13	9 - 12		

Table-II: Distribution of mean Post-operative GlasgowComa Scale score

Post -Operative Period	Glasgow Coma Scale (Mean ±SD)		T value	P value
	Group A	Group B		
1st POD	13.65±0.98	12.65±3.24	1.31	0.19
3rd POD	13.75 ±1.01	12.85 ±3.24	1.18	0.24
7th POD	13.85 ±0.93	13.00±3.17	1.14	0.25
After 1 mo nth	14.05±0.82	13.10±3.17	1.29	

In group A (n=20), before surgery, limb weakness was observed in 18 (90%) cases, whereas in Group B, limb weakness was observed in 19 (95%) cases. The difference of distribution of limb weakness between two groups was statistically not significant (p value >0.05) (Table-III).

Table-III: Distribution of pre-operative limb weakness

Limb weakness	Group A No. (%)	Group B No. (%)	χ^2/p value
			0.36 / 0.5
Present	18(90)	19(95)	
Absent	2 (10)	1(05)	
Total	20(100)	20(100)	

In group A (n=20), after surgery, out of 20 patients, limb weakness was present in 4(20%)patients and limb weakness was absent in 16(80%).In group B (n=20), limb weakness was present in 6(30%)and was absent in 14(70%). Difference of post-operative limb weakness between two groups was not statistically significant (p-value >0.05).(Table-IV)

Table-IV: Distribution of post-operative limb weakness

Limb weakness	Group A No. (%)	Group B No. (%)	X^2/p value
Present	4(20)	6 (30)	
Absent	16(80)	14(70)	0.53/0.35
Total	20(100)	20(100)	

In Markwalder grade O-1, the number of patients in group A were 12; and 08 patients were found in group B. In Markwalder grade 2-4, the number of patients in group A were 08; and 12 patients were found in group B. So, according to the scale, the difference was not statistically significant (p-value >0.05) (Table-V).

Table-V: Distribution of Markwalder Grading Scale in chronic subdural haematoma

Group	Mark w alder Grade 0-1	Mark w alder Grade 2-4	χ^2 / p value
Group A	12	8	1.6/0.17
Group B	8	12	

In Group A, recurrence was observed in 01 (5%) case and in Group B recurrence were observed in 2 (10%) cases. The difference was statistically not significant (p value >0.05) (Table-VI).

Table VI: Recurrence rate of chronic subdural haematoma after surgery in both groups

Recurrence	Group A	Group B	χ^2 / p value
Present	01 (05)	02(10)	
Absent	19(95)	18(90)	0.36/ 0.5
Total	20	20	

Discussion

The common occurrence of chronic subdural haematoma s in older patient raises some diagnostic and therapeutic difficulties. Despite general agreement about the indication of operation, the extent of surgery is still controversial. In the management of CSDHs burr-hole craniostomy and closed drainage should be the method of choice for initial treatment.[11] The continuous search for the best method of surgery led us to carry out this study in the department of Neurosurgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka during the period of June 2010 to November 2011.

In this study, the age range was between 50-70 years and mean age was 52.80 years in Group A and

53.15 years in Group B. In a study by Ernestus et al,[11] the mean age was 60 years, which correlates with this study. In this study, there was male predominance in both the groups. Male patients were 16(80%) in group A and 17(85%) in group B and female patients were 2(20%) in group A and 3(15%) in group B. Thus male were mostly affected in both groups. The male-female ratio was 4.71: 1. which correlates with the study of sanbasivan[7] where male–female ratio was 6:1.

In this study, mean preoperative GCS in group A was 10.45 and postoperative mean GCS was 13.65. In group B, mean preoperative GCS was 10.75 and postoperative one was 12.65. So, postoperative GCS in both group A and group B was better than those of preoperative ones. But GCS in group A was better than that of group B.

After operation, in group A, 4 (20%within the group) patients had postoperative limb weakness and limb weakness was absent in 16 (80% within the group) patients. In group B, postoperative limb weakness was present in 6 (30% within the group) patients and absent in 14 (70% within the group) patients. So, postoperative limb weakness were higher in group B than that of group A. But this difference was not statistically significant (p-value 0.46).

Within in group A, 12(60%) patients had a Markwalder grade of 1 after 48 hours and in group B, 8(40%) patients had a Markwalder grade 2 after 48 hours postoperatively where as study of Markwalder et al[12] demonstrates 75% patients had a Markwalder grade 1 in group 1, and 50% patients had a Markwalder grade 2 in group 2.

There is no report that demonstrates the superiority of double burr-holes over a single burr hole for the treatment of CSDH.[9] However, double burr-hole drainage was generally considered to yield a better result, especially regarding recurrence of the subdural collection.

Actually, both double burr-holes and single burr-hole CSDHs drainage were not statistically significant, but clinically, double burr-holes drainage is better than that of single-burr hole drainage.

It was found that double burr-hole procedure is better than single burr-hole procedure; but the difference is not statistically significant. The patients in both groups after intervention were almost similar and having a good quality of life according to GCS and Markwalder scale. This study recommends both double burr-hole drainage and single burr hole drainage surgery shows equal success in the management of CSDHs.

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