

The Outcome of Burr Hole Evacuation Without Drain for Chronic Subdural Haematoma

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ABSTRACT

Objective: To evaluate the feasibility of burr hole evacuation of Chronic subdural haematoma (CSDH) without drain in terms of functional outcome, morbidity & mortality.

Study design: Retrospective study.

Place & duration of study: Department of neurosurgery, postgraduate medical institute, Hayatabad medical complex Peshawar, from 1st July 2007 to 30th June 2008 with 3 months follow-up.

Patients & methods: This study included 65 patients who presented in our unit with Chronic subdural haematoma (CSDH) from 1st July 2007 to 30th June 2008. Inclusion criteria were patients presenting to us with Chronic subdural haematoma (CSDH) who were operated in our unit. Exclusion criteria were patients under 15 years of age, patients operated elsewhere & then referred to us, patients with recurrent Chronic subdural haematoma (CSDH) & those with concomitant brain tumor. A detailed history & clinical examination was done and CT-Scan without contrast was done along with other routine investigations following stabilization of patients using standard ATLS protocols. Treatment modality was single or double burr hole evacuation depending on the size of Chronic subdural haematoma (CSDH). All patients were followed up at 1 & 3 months post-operatively for symptomatic & neurological functions. Data was analyzed using SPSS-10 system.

Results: A total number of 65 patients presented to us with Chronic subdural haematoma (CSDH) in above mentioned duration with a male to female ratio of 3.2:1 (51/16). The age range was from 27 years to 81 years with a Mean age of 57.5 years. 5 (8%) patients were 40 years of age & below, 12 (18%) patients were 41-50 years of age 26 (40%) patients were 51-60 years of age 14 (22%) patients were 61-70 years of age 8 (12%) patients were 71 years of age & above-history revealed fall in 26 (40%), RTA in 9 (14%), while 28 (43%) had no history of trauma. The main symptoms were headache 52 (80%), disorientation 59 (91%), drowsiness 39 (60%), hemiplegia 12 (18%), & dysphasia 4 (6%). Clinical examination revealed. That according to Markwelder grading 20 (31%) were in grade 1, 23 (35%) were in grade 2, 15 (23%) were in grade 3 and 7 (11%) were in grade 4 respectively. CT-Scan showed. Chronic subdural haematoma (CSDH) on right side in 23 (35%), on left side in 20 (31%), & bilateral in 22 (34%) patients. Midline shift was present in 39 (60%) cases. Lesions were hypo dense in 35 (54%) & mixed density in 30 (46%). Surgery was performed in all cases with 11 patients having single burr hole evacuation with small Chronic subdural haematoma (CSDH) & remaining 54 patients having double burr hole evacuation with large Chronic subdural haematoma (CSDH). Re-accumulation of Chronic subdural haematoma (CSDH) requiring 2nd surgery 8 (12%) post-operative complications included sub-dural empyema in 1 (1.5%) case, wound infection 1 (1.5%) case and pneumocephalus in 1 (1.5%) case each. Overall mortality was 6 (9%) patients.

Conclusion: Single & double burr hole evacuation is a safe & effective treatment for Chronic subdural haematoma (CSDH) with low complications rate. The mortality associated with Chronic subdural haematoma (CSDH) is mainly determined by neurological status of the patient at time of presentation.

Key words & abbreviations: Burr hole evacuation, chronic subdural haematoma, Chronic subdural haematoma (CSDH), Computerized tomography scan, CT scan, Glasgow coma scale, GCS, Morbidity, Mortality.

INTRODUCTION

Chronic subdural haematoma (CSDH) is a commonly encountered neurosurgical problem. It is accumulation of blood & blood products between dura & arachnoid matter. Its incidence is about 1-2/100,000 population per year with incidence rising steeply above 70 years.¹ 40-60% patients have no history of trauma & those who do have history of trauma; the head may not have been struck at all.^{2,3} Brain atrophy related to old age causes increased gap between dura & arachnoid matter leading to stretching of bridging veins between arachnoid & dural sinuses⁴. Other predisposing factors are head injury, alcoholism, epilepsy, bleeding diatheses including anti-coagulation therapy,⁵ cardiovascular diseases, arachnoid's cyst etc.

The clinical presentation varies widely & includes headache,¹ altered conscious level,⁶⁻⁸ seizures,⁷ dementia,⁹ gait disturbances,⁵ focal neurological deficit³ hemiparesis,⁷ paraparesis. Diagnosis may not be straightforward. Hence high index of suspicion is required. Diagnosis is mainly by CT scan¹⁰ with some cases requiring contrast enhanced CT scan or MRI.¹¹ The mainstay of treatment is surgery¹² with some small Chronic subdural haematoma (CSDH) managed by observation, serial CT scan, bed rest and medication.⁵

Surgical options include single & double burr hole aspiration with or without drain, craniotomy, twist drill craniostomy, trephine craniotomy with cisternal drainage, endoscopic evacuation.^{13,14}

There is still no unanimity as to which is the best surgical procedure. In most studies functional & final outcome are determined mainly by the neurological status in which the patient presented.¹⁵ The purpose of our study is to evaluate burr hole evacuation of Chronic subdural haematoma (CSDH) without drainage system in terms of functional outcome, morbidity & mortality.

MATERIALS & METHODS

This study was conducted in post Graduate Medical Institute, Hayat Abad Medical Complex Peshawar from 1st July 2007 to 30th June 2008. The duration of this study was 1 year with 3 months follow-up. A total of 65 patients with CSDH presented to us in the above mentioned period who underwent single or double burr hole evacuation either under local or general anesthesia were included in this study. Exclusion criteria were patients with recurrent Chronic subdural haematoma (CSDH), patients operated elsewhere & then referred to our unit & patients with concomitant brain tumor.

At presentation detailed clinical history was taken along with history for coexisting ailments, thorough physical examination was done, & routine investigations were done following stabilization using standard ATLS protocols. The clinical grading of each patient was done according to the Markwalder scale¹⁶ at presentation. Diagnosis was confirmed mainly on CT scan (61 patients) while 4 patients had already underwent MRI Scan elsewhere. Patients were assessed if fit for general anesthesia. Evacuation of Chronic subdural haematoma (CSDH) was done under general anesthesia or local anesthesia either through single or double burr hole depending upon the size of hematoma, fitness of the patient for general anesthesia & consistency of hematoma on CT scan. Incision was one in posterior frontal, parietal or both. Following incision of dura blood was allowed to drain freely followed by irrigation with normal saline at 37°C until efflux was clear. It was then closed following normal saline put in the cavity to decrease risk of pneumocephalus. No drains were put in subdural space.

On 1st or 2nd post operative day patients were encouraged to walk around with chest physiotherapy given to those who were bed ridden. Neurological assessment was done on daily basis using Rathkin daily living score.

At 7th post operative day CT scan was performed to assess the efficacy of procedure & re-accumulation of Chronic subdural haematoma (CSDH).

Patients were discharged on 8th post-op day if no complications occurred.

Follow-up at 1 & 3 months was done to assess the clinical condition & any complication.

RESULTS

Total number of patients who presented to us from 1st July 2007 to 30th June 2008 was 65. Male to female ratio was 3.2:1 (51/16). Patients were grouped into four according to the neurological state in which they presented to us using **Markwalder scale (Table 1)**.

Table 1: The mode of admission was as follows;

	No. of patients	%age
Emergency department	31	(48%)
Out patient department	10	(15%)
Referred from other hospitals	10	(15%)
Referred from medical unit of our hospital	9	(14%)

Table 2: Markwelder grading revealed.

Grade	No. of Patients	% age
Grade 1	20	31
Grade 2	23	35
Grade 3	15	23
Grade 4	7	11

Table 3: Age Distribution.

Age group in year	No. of patients	%age
≤ 40	5	8%
41-50	12	18%
51-60	26	40%
61-70	14	22%
71 & above	8	12%

Table 4: Neurological deficit

	No. of patients	%age
Hemiplegia right side	8	(12%)
Hemiplegia left side	4	(6%)
Ataxia	39	(60%)

Table 5: Post-operative complications were as follows

	No. of patients	%age
Subdural empyema	1	(1.5%)
Wound infection	1	(1.5%)
Pneumocephalus	1	(1.5%)

The age range was from 27 years to 81 years with a mean age of 57.5 years. When age was divided into sub-groups patients' distribution was as follows (Table 2):

Clinical Features

History revealed fall in 26 (40%), RTA in 9 (14%), while 28 (43%) had no history of trauma. The main symptoms were headache 52 (80%), disorientation 59 (91%), drowsiness 39 (60%), hemiplegia 12 (18%), & dysphasia 4 (6%). The common presenting complaints were headache that was more pronounced on the

affected side & more common among the younger age group. The interval between head injury & appearance of symptoms ranged from 15 days to 6 weeks with a mean interval of 30 days.

Co-morbid conditions include hypertension in 18 (28%), ischemic heart disease in 7 (11%), diabetes mellitus in 12 (18%), chronic renal failure in 1 (1.5%).

CT scan revealed hypo-dense lesion in 35 (60%) cases while the rest were of mixed density.

The site of hematoma was relatively uniform with lesion occurring on right, left & bilateral in 23, 20 & 22 respectively.

Surgical Procedures

All patients underwent burr hole evacuation under general or local anesthesia. 11 patients with small CSH had single burr hole while the remaining underwent double burr hole evacuation. No drains were kept.

Complications

Post-operative complications occurred in 11 (17%) patients with recurrence of Chronic subdural haematoma (CSDH) being the most frequent 8 (12%). Other complication occurred one each in our study & include subdural empyema, tension pneumocephalus, wound infection.

Outcome

Patients were assessed for any neurological improvement & the results were as follows:

52 (80%) patients showed excellent recovery, 8 (12%) showed good recovery, 3 (4.5%) did not improve & 2 (3%) patients deteriorated. The overall mortality was 6 patients (9%) with one per-operative death, one during hospital stay & remaining occurred after discharge from hospital. 2 (3%) deaths occurred in patients presenting in Markwelder grade 3 & 4 (6%) occurred in patients with Markwelder grade 4.

DISCUSSION

Chronic subdural haematoma (CSDH) is a common neurological condition encountered in neurosurgical units.

The incidence is high among the old age group. Atrophy of brain due to any cause leads to stretching of bridging veins between arachnoid & dural sinuses that bleed readily with relatively minor trauma.

The expansion of Chronic subdural haematoma (CSDH) was thought to be due to high osmotic pressure created by breakdown products of blood cells.¹⁷ This was disproved by Weir who showed that there was no osmotic gradient between hematoma & plasma,¹⁸ & supported by Eto et al¹⁹ who showed repeated bleeding in Chronic subdural haematoma (CSDH) attributed mainly to new fragile vessels formed between dura & neo-membrane of Chronic subdural haematoma (CSDH).²⁰

Abnormalities of coagulation & increased fibrinolytic activity in Chronic subdural haematoma (CSDH) also contribute to its expansion.²¹ It was first described by Balzac, in 1840.²² In 1883 Hulke described its successful surgical treatment.²³ The clinical presentation varies widely and high index of suspicion is required to diagnose Chronic subdural haematoma (CSDH) which is evident in our study by the fact that 14% of our cases were referred from medical unit of our hospital. The most common presenting symptom in our patients was headache. Headache in Chronic subdural haematoma (CSDH) is more common among the younger age group as they have less sub-dural space to accommodate hematoma.^{1,5} When compared with the populations of developed countries, the proportion of old age in our population is low leading to higher number of patients in lower age groups having Chronic subdural haematoma (CSDH) contrary to developed countries. The treatment is mainly surgical with patients showing favorable outcome in terms of morbidity & mortality if operated.²⁴

In the modern era there is an array of surgical options for Chronic subdural haematoma (CSDH) including twist-drill craniostomy, single & double burr hole aspiration with or without drain, craniotomy, trephine craniotomy with cisternal drainage, endoscopic evacuation, craniotomy & is described as the great neurosurgical imitator. There is no unanimity as to which approach is the best for all the patients. While one may be superior in one setting, may not be so in the other. As membranectomy has been ruled out as an essential step in Chronic subdural haematoma (CSDH) evacuation, the role of craniotomy has decreased significantly.²⁵ However it is still the best approach in some settings (for example recurrence, solid hematoma).²⁶

In our study we performed single or double burr hole evacuation without drainage. With drainage it is the safest and most effective treatment in most cases.^{26,27}

In our study the overall morbidity was 11 (17%) with recurrence of Chronic subdural haematoma

(CSDH) being the most common complication 8 (12%). Recurrence tend to occur in patient who show poor brain expansion during & after surgery caused by increased brain elastance, pneumocephalus, organized subdural membrane & poor central blood flow. The fact that we did not use any drain may also have contributed to higher recurrence rate. The other complications (subdural empyema, tension pneumocephalus, wound infection) occurred in one patient each.

The overall motility of Chronic subdural haematoma (CSDH) is around 6.5%²⁴ & correlates strongly with the neurological status of the patient.¹⁵

In our study the overall mortality was 6 (9%). It correlates well with the fact that all the patients who died presented to us in poor neurological state hence poor outcome.

CONCLUSION

The prognosis of chronic subdural hematoma is significantly affected by neurological status of the patient at presentation. Single/double burr hole evacuation is a safe & effective treatment modality & results can be improved with placement of subdural closed drains.

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