



SINGLE VERSUS DOUBLE BURR HOLE EVACUATION OF CHRONIC SUBDURAL HEMATOMA – A PROSPECTIVE STUDY

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ABSTRACT **Objective:** Chronic subdural hematoma (CSDH) commonly recurs after surgery and Burr hole Drainage (BHD) is the commonest procedure for its treatment. Number of burr holes may have bearing on the recurrence rate of CSDH.
Materials and Methods: A prospective randomized study to investigate the effect of number of burr holes on the recurrence rate of CSDH was undertaken. During the study period, 170 patients were enrolled for the study, and randomized using Random allocation software, but only 140 patients completed the study. 70 patients were in “Single BHD” group (Single burr hole made) and 70 patients were in “Double BHD” group (Double burr hole made). The primary end point was symptomatic recurrence needing re-drainage up-to a period of 6 month.
Results: Recurrence occurred in 11 patients in “Single BHD” group, and 7 patients in “Double BHD” group ($p = 0.456$). The medical and surgical complications were comparable between the two study groups.
Conclusion: Single burr hole is as effective as Double burr hole for CSDH treatment and is less time consuming and less morbid to the patient.

KEYWORDS : Chronic subdural hematoma, Burr hole drainage, Recurrence

Introduction

Chronic subdural hematoma (CSDH) is common neurological problem often occurs in elderly. Its incidence is about 5/100,000/year in the general population, but is higher for those aged 70 years and older, 58/100,000.¹ The etiology of CSDH is commonly attributed to head injury in about 50% of the patients.² In rest of the patients definite cause is not known. Burr hole craniostomy is the most popular surgical technique worldwide.

Recurrences are a major problem and require re-rinsing of the subdural space, sometimes repeatedly. The reported recurrence rate ranges from 9.2% to 26.5% after surgical evacuation.³ Various factors have been noted to have a bearing on recurrence rates that include multilocularity of CSDH, presence of coagulopathy and use of sub-dural drain during CSDH surgery.⁴ However, the effect of number of burr holes made during CSDH surgery on their recurrence rates has not been well settled. This study was carried out to settle this issue.

Materials and Methods

During the period of January 2017 to June 2018, all the patients of symptomatic CSDH proven by computed tomography (CT) scan admitted in Neurosurgery Unit of Department of Surgery of MLN Medical College and SRN Hospital, Prayagraj were allocated randomly in two groups using random allocation software. Randomization was done before surgery. The two groups are: “Single BHD” where single burr hole made with subdural drain and “Double BHD” where two burr holes made with subdural drain.

Exclusion criteria were: (1) Patients with ipsilateral hematomas who had undergone cerebrospinal fluid (CSF) diversion within 6 months of presentation; (2) patients in whom surgery other than burr hole evacuation was indicated; (3) Patients not needing surgical treatment either because of size of CSDH or clinical status of patients; and (4) patients in whom brain completely surfaced after BHD of CSDH.

“Recurrence” was defined as the occurrence of symptoms and signs attributable to an ipsilateral hematoma seen on a CT scan within 6 months of original drainage procedure.

Surgical Technique

After getting consent and randomisation, surgeries were done under local or general anaesthesia. In “Single BHD” group, the burr hole

were made at posterior parietal region, and in “Double BHD” group, burr holes were made at posterior parietal area and posterior frontal area. Bilateral CSDH cases were considered as one case and both sides received the same treatment as per randomisation chart.

The subdural space was irrigated copiously with normal saline by soft silicon catheter till clear returns came and closed system drain was put in subdural space through parietal burr hole and tunnelled for about 5 cm away from scalp incision. The drain was kept in dependent position for 48 hours and then removed after doing a non-contrast CT scan. The patients were followed-up with clinical symptoms or signs and if required repeat CT imaging was done.

Follow-up

After discharge from hospital, patients were followed up in the outpatient department, initially at fortnightly for 1 month, and then on a monthly basis for up to 6 months.

Statistical methods

Student t-test was applied for comparison between two groups and Chi-square test for checking the association for the outcome variables. A $p < 0.05$ was considered as statistically significant. Mean, standard deviations, and medians were reported for interval variables, and percentage for categorical variables. Statistical analysis was conducted with SPSS statistical package (version 17.0; SPSS Inc, Chicago, IL USA).

Results

During study, 192 symptomatic CSDH patients were assessed for study and 170 patients fulfilling the inclusion criteria were enrolled for study. 85 patients were in “Single BHD” group and 85 patients were in “Double BHD” group. 3 patients expired in “Single BHD” group while 5 expired in “Double BHD” group during hospital stay or during follow-up. During follow-up, 12 patients were lost to follow-up in “Single BHD” group and 10 patients were lost to follow-up in “Double BHD” group. So, 70 patients in each group completed the study.

The common clinical symptoms were headache, hemiparesis, vomiting, dementia and seizures in decreasing order in our study. Most of the patients were in Glasgow Coma Scale 9-15 (82%). Patients were also evaluated for co morbidities. Brain atrophy, history of trauma and hypertension were common.

Preoperatively various CT parameters as density of hematoma, Volume of CSDH, Mid line shift were compared in two groups. Peri-operative parameters such as color of subdural fluid, opening subdural fluid pressure, brain expansion, approximate volume of CSDH evacuated and saline used for irrigation were also compared in two groups. Comparisons of these parameters were statistically not significant between two groups.

In patients "Single BHD" group, 11 patients suffered from symptomatic recurrences of CSDH, while 7 patients suffered from recurrences in "Double BHD" group. The recurrence between two groups was statistically not significant (p value = 0.456), and the difference of mortality in two groups was statistically not significant (p value = 0.719). The improvement in both the group of patients at the end of 2 weeks was comparable, and there was no statistically significant difference between them. Of the 11 recurrences in "Single BHD" group, 10 patients were re-operated once and 1 patient was re-operated twice. Out of 7 patients with recurrence in "Double BHD" group, all were re-operated once, and none required further surgeries. Re-operation was done if the original neurological deficits worsened, recurred, did not improve, or a new neurological deficit occurred that needed further surgery.

Discussion

CSDH are common in the elderly, and their treatment is continued to be a challenge.⁵ A history of trivial head injury is usually present in 50 to 60% of patients. In our study, head injury was seen in 72% of patients and most of them had history of fall. Similar were the observations in the study by Baechli et al.⁶ The evolution of CSDH is probably due to a complex interaction between the CSDH fluid and the outer membrane histology. One of the theories of increase in CSDH is due to the local fibrinolysis resulting in liquification of the clot.⁷ As the CSDH mature over time, the fibrous content increases along with the decrease in the cellular and vascular component.

Burr hole drainage is the commonest and established procedure for treatment of CSDH. Though there are very few prospective studies to compare the number of burr hole with recurrence rate of CSDH.^{8,9} Subdural drain is inserted in subdural space in all patients of CSDH in whom did not surface after evacuation of hematoma, as putting subdural drain leads to less recurrence rate as has been proved by various prospective studies.⁴

Kansal et al in his retrospective study of 267 patients, in which he had excluded patients with bilateral collections, coagulopathy, and significant brain atrophy also found no significant difference between recurrence rate after single versus double burr hole evacuation of CSDH.⁹ Similarly, a prospective study by Nayil et al also does not find statistically significant recurrence rate between single and double BHD treated CSDH.⁸

Our study is a prospective randomised study and we have included patients with bilateral subdural collections, coagulopathy, and subdural drain routinely used in all those patients where brain did not surface after evacuation of CSDH, and we also find no significant difference in the recurrence rate and mortality between two groups.

Conclusion

In this study, the recurrence rate of CSDH treated by either single or double burr hole is statistically not significant. So, Single burr hole drainage is as effective as double burr hole drainage of CSDH. Single burr hole should be preferred as it is less time consuming and causes less morbidity to the patients. Double burr hole should be reserved for large and multilocular CSDH.

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