

Surgical Outcome of Subdural Hematoma by Single Vs Double Burr Hole Technique

ASAD JAVED,¹ SULTAN JALAL-UD-DIN FAISAL,² NIAZ AHMAD KHAN,³ SULTAN SHAH,⁴ MUHAMMAD SAJID MEHMOOD,⁵ SAJID RAZZAQ,⁶ SHAMSUDDIN⁷

^{1,7}Quaid-e-Azam International Hospital, Rawalpindi, Pakistan

²Liaqat National Hospital, Karachi, Pakistan

³PIMS, Islamabad, Pakistan.

^{4,6}Ponch Medical College, AJK, Pakistan

⁵Frontior Medical College, Abbottabad, Pakistan

ABSTRACT

Objective: To determine frequency of a favorable outcome of chronic subdural hematoma patients by single vs. double burr hole technique.

Materials and Methods: A randomized controlled trial was done in Neurosurgery Department, Pakistan Institute of Medical Sciences, Islamabad from 15th September 2016 to 15th August 2017. All patients in group A were operated through a single burr-hole technique either under general anesthesia or local. Group B patients were operated through double burr-hole technique.

Results: One hundred patients were included in this study, divided into two groups. Group A had mean age 54 years with STD of ± 5.7 while in group B, mean age was 53 years with STD of ± 6.3 . In group A there were 35 (70%) male and 15 (30%) female patients while group B had 30 (60%) male and 20 (40%) female patients. In group A, mean GCS was 12.78 with STD of ± 1.4 . In group B, mean GCS was 12.64 with STD of ± 1.3 . The favorable outcome after surgery was attained in 43 (86%) patients in Group A while 46 (92%) patients in Group B.

Conclusion: Chronic subdural hematoma is a complication seen in older age after trivial trauma history. Single burr-hole drainage of hematoma is an effective method of treatment when compared with double burr-hole method which is more time consuming.

Abbreviations: CSDH: Chronic Subdural Hematoma. CT: Computed Tomography. GCS: Glaucoma Outcome Scale.

Keywords: Chronic Subdural Hematoma, Single burr-hole craniotomy, Double burr-hole craniotomy.

INTRODUCTION

Chronic subdural hematoma (CSDH) is a collection of blood in the subdural space of more than 21-days duration.¹ It involves single hemisphere in 75-80% cases & 20-25% cases of CSDH are bilateral.² Hematoma fluid is dark "motor oil" in appearance which does not clot. Its surgical outcome is good but the chances of recurrence are up to 33%.³ Commonly it is a disease of elderly people with an average age of

63 years in whom brain atrophy increases potential subdural space thereby increasing chances of bridging veins to bleed after head trauma but can occur at the age. Coagulopathy, Antiplatelet/anticoagulants agents increase chances of chronic subdural hematoma.⁴ Postoperative outcome in terms of Glasgow coma scale is good in majority of cases.^{5,6} Treatment options include medical/expectant⁷, two burr-holes drainage⁸, single large burr-hole drainage,⁸ twist drill

craniostomy or craniotomy, endoscopic removal especially in infants and septated or organized.⁹ Craniotomy is usually reserved for recurrent chronic subdural hematoma and middle meningeal artery ligation applied in repeated recurrence of CSDH.^{9,10}

MATERIAL AND METHODS

Study Design

Retrospective study.

Patients with CSDH admitted in the Neurosurgery Department of Pakistan Institute of Medical Sciences, Islamabad (PIMS) from 15 September 2016 to 15 August 2017.

Inclusion Criteria – Subdural Haematoma

Cases were selected randomly through Out Patient Department (OPD), Emergency and Calls from other units of the hospital were operated. Only unilateral chronic patients were included patient were.

Exclusion Criteria – CSDH

Bilateral chronic subdural haematoma, recurrent Ch SDH and organized chronic subdural haematoma, cases with bleeding disorder were excluded.

Data Collection Procedure

Only those patients who fulfilled the inclusion criteria were selected in the study. Informed consent was obtained from the patient or the family. For the collection of information and observations, a predesigned form was used. Diagnosis of CSDH was made on the basis of history, clinical features, CT brain and peroperative findings. Only patients of unilateral chronic subdural hematoma were operated.

Surgical Procedure

All patients in group A were operated through a single burr-hole technique either under general anesthesia or local.

Patients were positioned in the supine position with the tilted head to opposite side and flat or downward on the operating table. Local anesthesia with adrenaline at incision sites was given to all patients, in order to decrease per operative bleeding and pain after surgery. After cleansing and draping, skin incision was made and one burr-hole was made at the most dependent site of the hematoma, as guided by CT scan finding. After burr hole, the dura was

cauterized and then incised on both sides of the burr hole. After complete drainage, a subdural irrigation was done using normal saline solution under low pressure until clear fluid started coming out. At the end, SURGICEL was applied on site of burr hole. In all cases, the subdural cavity was filled with normal saline so that no air should remain inside to prevent postoperative pneumocephalus. Hemostasis was secured and incision wounds were closed in layers in reverse order.

Group B patients were operated through double burr-hole technique. One burr-hole was made at Kocher's point and another was made in the parietal region. Patient bed head-end was kept flat.

All the patients were assessed for improvement in neurological status immediately postoperatively on the same day as well as throughout their stay in hospital. If the neurological status deteriorated, a repeat CT scan was done for recollection or other postoperative intracranial complication. A routine CT scan brain was done 48 hours postoperatively. The patients were discharged after complete physical and neurological assessment after 3 days and follow up CT scan brain was done one month postoperatively.

Data Analysis

At follow-up patients were assessed for recurrence and were categorized either as favorable outcome or unfavorable outcome at one month. To control confounders and bias in the study results, exclusion criteria were followed strictly.

RESULTS

A cohort of 100 subjects was selected in this study. The subjects were distributed into two equal groups.

Age Incidence

The minimum age group A was 35 years, while maximum age was 64 years. The mean age was 54 years with STD of ± 5.7 . The minimum age in group B was 35 years, whereas the maximum age was 63 years. The mean age was 53 years with STD of ± 6.3 (70%).

Gender Distribution

Group A included 35 males and 15 (30%) female patients, while in group B there were 30 (60%) males and 20 (40%) females.

Clinical Presentation

The minimum span of illness was 24 days while the maximum was 46 days in group A. The mean duration of illness was 34 days with STD of ± 5.7 . The minimum duration of illness was 23 days, whereas maximum duration was 46 days in group B. The mean duration of illness was 33 days with STD of ± 5.8 . In Group A there were 2 patients in the age category of 31-45 years old, 24 in 46-55 years old and 24 in 56-65 years old. In Group B there were 3 patients in the age category of 31-45 years old, 25 in 46-55 years old and 22 in 56-65 years old.

In group A, the minimum initial GCS was 8.00 maximum was 14 mean GCS was 12.78 with STD of ± 1.4 . In group B, the minimum initial GCS was 8.00 maximum was 14 mean GCS was 12.64 with STD of ± 1.3 . In group A, the minimum follow up GCS was 13 maximum was 15 mean follow up GCS was 14.72 with STD of ± 0.701 . In group B, the minimum follow up GCS was 12 maximum was 15 mean follow-up GCS was 14.80 with STD of ± 0.7 .

Outcome

In Group A, 43 (86%) patients had a favorable outcome, while, in Group B, 46 (92%) patients were with favorable outcome. 32 male patients had a favorable outcome in Group A, and 28 in Group B. Similarly, 11 female patients in Group A, and 18 in Group B had favorable outcomes. However, p-values were insignificant.

Depending on the age, 23 had favorable outcome in the age category of 46-55 years in group A and 24 in group B. There were 18 patients with favorable outcome in the age category of 56-65 years in group A and 19 in group B. However, p-values were insignificant.

There were 07 favorable outcome patients in the duration of illness category of 22-30 days in group A and 15 in group B, there were 27 favorable outcome patients in the duration of illness category of 31-40 days in group A and 27 in group B and there were 09 favorable outcome patients in the duration of illness category of 41-50 days in group A and 04 in group B. However, p-values were insignificant.

There were 32 favorable outcome patients in the initial GCS category of 13-15 in Group A and 33 in group B. There were 11 favorable outcome patients in the initial GCS category of 10-12 in Group A and 13 in group B, and there were no favorable outcome

patients in initial GCS category of 8-9. However, p-values were insignificant.

DISCUSSION

In our study single burr-hole craniotomy was compared to double burr-hole craniotomy for chronic subdural hematoma. Both groups showed comparable results; group A 86% patients had favorable outcome comparable to group B with 92% patients with favorable outcome. Only 14% patients in group A and 08% patients in group B had unfavorable outcome.

Other studies done on similar basis have shown similar results. In a study on 245 patients with symptomatic Chronic Subdural Hematoma diagnosed on the basis of CT scan. They were treated either by a single hole drainage or double burr-hole enlarged drainage. In all the cases, subdural drain was placed. The double burr-hole drainage was carried out in 156 (63.7%) patients (group A) while enlarged single burr-hole drainage in 89 (36.3%) patients (group B). It was noted that there were nine recurrences in group A, while five in group B; however, the difference was not statistically significant.¹¹

In a cohort of 354 patients surgery was done for Chronic Subdural Hematoma over a period of 7 years. It was found that CSDH is more common in elderly (≥ 65 years) than in younger people (69 vs. 31%, Also in men than in women (64 vs. 36%). Falls were testified in 77% of patients. The postoperative mortality was 0% and the recurrence rate was 13.6%.¹² A retrospective analysis of 267 patients treated surgically with CSDH by either single or double burr holes revealed a similar rate of recurrence in both the groups ($p > 0.05$).¹⁴

In a recent study, Chang Hwan Pang et al. used burr-hole technique in 303 patients with CSDH. 213 (70.3%) had single burr hole while 90 (29.7%) had a double burr-hole. The recurrence rate was 13.6% in single burr hole while it was 8.88% with double burrhole.¹⁵ Taussky et al. performed burr-hole drainage of CSDH in 97 patients. Single burr-hole was done in 34 patients while 63 were treated with double burr hole. Recurrence was 5% with double burr-hole while it was 29% with single burrhole.¹⁶ Rehman et al has shown that outcome with two-burr-hole technique is excellent in more than 86% of patients while only 6.6% were discharged with moderate disability and a recurrence rate of only 6%.¹⁷ Khanzada et al. has shown a recurrence rate of 17.6% patients.¹⁸

CONCLUSION

Chronic subdural hematoma is a complication seen in older age after trivial trauma history. Single burr hole is an effective method of treatment as compared to double burr-hole technique with similar outcome in terms of recurrence with less surgical and hospitalization time.

ROLE OF AUTHORS

Dr. Asad Javed and Dr. Niaz Ahmad Khan: Literature review.

Dr. Sultan Jalal-ud-Din Faisal: Paper Editing and Results Writing.

Dr. Sultan Shah and Dr. Muhammad Sajid Mehmood: Data Collection.

Dr. Sajid Razzaq and Dr. Shamsuddin: Paper Writing.

Additional Information

Disclosures and Conflict of Interests:

Authors report no conflict of interest.

Human Subjects: Consent was obtained by all patients/ participants in this study.

In compliance with the ICMJE uniform disclosure form, all authors declare the following:

Financial Relationships: All authors have declared that they have no financial relationships at present with any organizations that might have an interest in the submitted work.

Other Relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

Address for Correspondence:

Dr. Asad Javed, Assistant Consultant

Quaid-e-Azam International Hospital, Rawalpindi

Email: asad.amc@gmail.com

REFERENCES

- Nayil K. et al. Chronic Subdural Hematomas: Single or Double Burr Hole. Turk Neurosurg. 2014; 24 (2): 246-8.
- Andersen N C, Poulsen F R, Bergholt B, Hundsholt T, Fugleholm K. Bilateral chronic subdural hematoma: unilateral or bilateral drainage?. J Neurosurg. 2017; 126: 1905-1911.
- Liu W, Bakker N A, Groen R J M. Chronic Subdural Hematoma: A Systemic Review and Meta-Analysis of Surgical Procedures. J Neurosurg. 2014; 121: 665-673.
- Miranda L B, Braxton E, Hobbs J, Quigley M R. Chronic Subdural Hematoma In Elderly: Not A Benign Disease. J Neurosurg. 2011; 114: 72-76.
- Leroy H-A, Aboukais R, Reyns N, Bourgeois P, Labreuche J, Duhamel A et al. Predictors Of Functional Outcomes And Recurrence Of Chronic Subdural Hematomas. J Clin Neurosci. 2015; 22 (12): 1895-900.
- Javadi A, Amirjamshidi A, Aran S, Hosseini SH, A Randomized Controlled Trial Comparing The Outcome of Burr-Hole Irrigation With and Without Drainage in The Treatment of Chronic Subdural Hematoma: A Preliminary Report. World Neurosurg. 2011; 75 (5-6): 731-6.
- Henaus P-L, Le Reste P-J, Laviolle B, Morandi X. Steroids In Chronic Subdural Hematomas (SUCRE Trial): Study Protocol For A Randomized Controlled Trial. Trials. 2017; 18: 252.
- Belkhair S, Pickett G. One Versus Double Burr Holes For Treating Chronic Subdural Hematoma Meta-Analysis. Can J Neurol Sci. 2013; 40: 56-60.
- Chari A, Kolia A, Santarius T, Bond Simon, Hutchinson P J. Twist – Drill Craniostomy with Hollow Screws for Evacuation of Chronic Subdural Hematoma. J Neurosurg. 2014; 121: 176-183.
- Balser D, Rodgers SD, Johnson B, Shi C, Tabak E, Samadami U, Evolving Management Of Symptomatic Chronic Subdural Hematoma: Experience Of A Single Institution And Review Of The Literature. Neurol Res. 2013; 35 (3): 233-42.
- Pahatouridis D, Alexiou GA, Fotakopoulos G, Mihos E, Zigouris A, Drosos D, et al. Chronic Subdural Haematomas: A Comparative Study Of An Enlarged Single Burr Hole Versus Double Burr Hole Drainage. Neurosurgical Review, 2013; 36: 151-5.
- Baechli H, Nordmann A, Bucher HC, Gratzl O. Demographics and Prevalent Risk Factors of Chronic Subdural Haematoma: Results of a Large Single-Center Cohort Study. Neurosurgical Review, 2004; 27: 263-6.
- A. Single Versus Double Burr Hole Drainage of Chronic Subdural Hematomas. A Study of 267 Cases. J Clin Neuroscience, 2010; 17: 428-9.
- Edward B, Bridges, McIntyre BR, Madden TA, William O. The Single Burr Hole Technique for the Evacuation of Non-Acute Subdural Hematomas. J Trauma-Injury Infec Crit Care, 1994; 36: 96-102.
- Pang CU et al. Acute Intracranial Bleeding and Recurrence After Burhole Craniostomy for Chronic Subdural Hematoma. J Neuro Surg. 2015; 7: 65-74.
- Smith MD et al. Surgical Management of Chronic Subdural Hematoma: One Hole or Two? International Journal of Surgery, 2012; 10: 450-452.
- Ur Rehman R, Khattak A, Azam F, Alam W. Outcome Of Chronic Subdural Hematoma Patients Treated By Two Burr Holes Method. Gomal J Med Sci. 2010; 8 (2): 76-84.
- Khanzada K, Ali M. Management of Chronic Subdural Hematoma. J Postgrad Med Inst. 2011; 18: 37-43.