



BURR HOLE DRAINAGE VERSUS MINI CRANIOTOMY IN THE MANAGEMENT OF CHRONIC SDH

Neurosurgery

Dr. Asman Ali

Associate Professor, Department of Neurosurgery, Gauhati Medical College & Hospital.

Dr. Dhrubajyoti Das*Senior Resident Department of Neurosurgery, Gauhati Medical College & Hospital.
*Corresponding Author

ABSTRACT

Introduction: Chronic subdural hematoma is a common entity that is most commonly seen in elder population. In this study we analyzed outcome following burr hole and mini craniotomy in patients with chronic subdural hematoma in a tertiary care hospital in northeastern India. **Methods:** From 1st August 2021 to 31st July, 2022, 75 patients who were treated with burr hole drainage and mini craniotomy for the symptomatic chronic subdural hematoma were enrolled. Pre and postoperative computed tomography (CT) were used for radiologic evaluation. The choice of procedure was decided by preoperative CT images. **Results:** 50 patients out of 75 patients underwent burr hole drainage, whereas 25 patients underwent mini craniotomy. The burr hole group had a recurrence rate of 10% compared to 4% in the mini craniotomy group. The number of days of hospitalization was 6.9 ± 4.7 days in burr hole drainage group and 10.3 ± 3.2 days in mini craniotomy group. **Conclusion:** Burr hole drainage would be sufficient to evacuate chronic subdural hematoma, but mini craniotomy was also needed in some cases with hematoma having a solid portion or multiple septum or pseudo membranes.

KEYWORDS

INTRODUCTION

Chronic subdural hematoma is a common clinical entity that is most commonly seen in the elderly population¹. Most patients have history of trauma, frequently mild. The three primary surgical techniques for treating persistent subdural hematoma are twist drill craniostomy, burr hole craniostomy, and craniotomy². Burr hole craniostomy is still the most widely used procedure for chronic subdural hematoma. The recurrence rate of chronic subdural hematoma has been found to be highly variable ranging from 3-37%^{3, 4}. Mini craniotomy has been shown to have similar results but tend to have a longer duration of hospital stay⁵. In this study we analyzed outcome following burr hole and mini craniotomy in patients with chronic subdural hematoma in a tertiary care hospital in northeastern India.

MATERIALS AND METHOD

This study was carried out in Department of Neurosurgery, Gauhati Medical College & Hospital, Guwahati, Assam between August 1st, 2021 to 31st July 2022. All patients of age > 15 years attending the casualty department or Neurosurgery OPD with CT suggestive of chronic subdural hematoma were included in the study. Patients with history of anticoagulant usage, hepatic or renal insufficiency or previous history of craniotomy were excluded from the study. Data including demographics, history of trauma, comorbidities, clinical and CT findings including thickness of hematoma, midline shift, duration of stay in hospital, outcome measured as Glasgow outcome score, were noted down. The surgical method was determined according to the pattern of hematoma on brain CT images. The recurrence rate and length of hospitalization days were compared between the patients with burr hole drainage and small craniotomy. Statistical significance was set to ≤ 0.005 . Findings were statistically analyzed by using statistical package for social sciences (SPSS) software for windows.

Table 1: Characteristics And Clinical Findings Of Patients

	Burr hole group	Mini craniotomy group	Total
Male	35(70%)	17(68%)	52
Female	15(30%)	8(32%)	23
Total	50	25	75
Mean age	62.4(38-82) years	61.6(45-76) years	
Head injury	22(44%)	8(32%)	
Clinical Symptoms			
Headache	20(40%)	12(48%)	
Hemiparesis	31(62%)	17(68%)	
Seizure	1(2%)	0	
Altered consciousness level	3(6%)	1(4%)	

Table 2: Location Of Subdural Hemorrhage.

Location of SDH	Right	Left	Bilateral	Total
FTP	20	30	15	65

Parietal	4	6	0	109
----------	---	---	---	-----

RESULTS

In our study patients were of the age group between 38-82 years. A total of 75 patients were included in the study. 50 patients underwent burr hole drainage while 25 patients a mini craniotomy of diameter less than 5 cm. 69.33% of patients were male and 30.7% were female. Males accounted for 70% and females accounted for 30% in the burr hole group while in the mini craniotomy group males and females accounted for 68% and 32% respectively. Mean age in the burr hole group and mini craniotomy group were 62.4(38-82) years and 61.6(45-76) years respectively. Only 44% patients in the burr hole group and 32% patients in the mini craniotomy group could recall any history of head injury. Hemiparesis was noticed in 62% and 68% patients in the burr hole group and the mini craniotomy group respectively. Other symptoms included headache, altered consciousness level and seizure.

Table 3: Average Surgery Duration, Recurrence Rate And Mean Hospitalization

Characteristic	Burr hole group	Mini craniotomy group	P value
Average surgery duration	48±22 minutes	57±14 minutes	0.12
Recurrence	5(10%)	1(4%)	0.04
Mean hospitalization	6.9±4.7 days	10.3±3.2	0.03

Average duration of surgery required in the burr hole group was found to be less than in the mini craniotomy group but it was not found to be statistically significant. The burr hole group had a recurrence rate of 10% compared to 4% in the mini craniotomy group which was found to be statistically significant. Mean hospitalization duration in the burr hole group was found to be 6.9 ± 4.7 days while in the mini craniotomy group was found to be 10.3 ± 3.2 days.

DISCUSSION

According to estimates, the incidence of chronic subdural hematomas ranges from 8 to 14 per 100,000 person-years⁶. It is generally known to occur in the elderly population, and is reported to be the highest incidence in the 60s and 70s. The mean age in our study was 62.4(38-82) years in the burr hole group and 61.6(45-76) years in the mini craniotomy group.

It is recognized that a chronic subdural hematoma can result from a variety of factors, including trauma, the use of alcohol and anticoagulants, and hemorrhagic diseases⁷. Head trauma may often be mild such that the patient may not even be aware of it. In our study only 40% patients could give a history of head trauma.

Hemiparesis, headache, loss of consciousness, and seizures are the usual common presenting symptoms of chronic subdural hematoma and presented symptoms was reported hemiparesis in 58%, headache

in 14–80%, seizures in less than 6%, and unconsciousness in 36%^{8,9}. The incidence of symptoms observed in our study was similar to the previous published literature.

Burr hole drainage is the most commonly used operative method in the management of chronic subdural hematoma owing to its low morbidity and recurrence rate. Burr hole drainage is the most efficient and least complicated way for treating a chronic subdural hematoma¹⁰⁻¹². On the other hand, a mini craniotomy can be done if there are frequent recurrences, solid hematomas, or septa in subdural hematoma¹³. In particular in subdural hematomas with multiple compartmentalized lesions, burr hole drainage might result in incomplete evacuation. Also during the placement of the drainage catheter acute hemorrhage might occur that will require redo surgery¹⁴. A mini craniotomy might be preferable in such cases.

In our study 50 patients underwent burr hole drainage with irrigation. Zakaraia et al¹⁶ and Gurelik et al¹⁷ reported no difference in clinical efficacy and recurrence rate between the irrigation and non-irrigation groups. Santarius et al¹⁸ compared burr-hole evacuation with drains group versus no drains after burr-hole evacuation. The recurrence rate was lower in the drain group than in the no drain group. In our study we kept the drain for 48hrs after subdural hemorrhage drainage in the burr hole group.

Mondorf et al¹⁹ conducted a retrospective study about treatment effect and recurrence of 193 patients with chronic subdural hematoma. Craniotomy were performed in 151 patients and burr hole drainage were performed in 42 patients. In that study, recurrence was observed in 27.8% of patients who underwent craniotomy and 14.3% in patients who underwent burr hole drainage. According to a study by Jacqueline et al. the reoperation rate for chronic subdural hematoma with burr hole surgery was about 6.6% as compared to 24.2% in the craniotomy patients²⁰.

Sudha Ram et al²¹ conducted a study on 23 patients who underwent a mini craniotomy for chronic subdural hemorrhage and observed a recurrence rate of 4.3% only. In our study, a recurrence rate of 4% was observed in the mini craniotomy group as compared to that of 10% in the burr hole drainage group. The mini craniotomy group did require longer hospitalization compared to the burr hole group.

CONCLUSION

In patients with chronic subdural hematoma, burr hole drainage is considered safe and effective treatment method because of lower recurrence rate and short hospitalization days than small craniotomy. But mini craniotomy allows better visualization of the subdural space, enabling removal of the subdural outer membrane and obtaining meticulous hemostasis. Hence in selective cases of chronic subdural hematoma which has solid portion or multiple septum and pseudo membranes in CT findings, small craniotomy could be considered.

REFERENCES

1. R. Sahyouni, K. Goshtasbi, A. Mahmoodi, D.K. Tran, J.W. Chen, Chronic subdural hematoma: a historical and clinical perspective, *World Neurosurg.* 108 (2017) 948–953.
2. R. Weigel, P. Schmiedek, J.K. Krauss. Outcome of contemporary surgery for chronic subdural haematoma: evidence based review, *J. Neurol. Neurosurg. Psychiatry* 74 (2003) 937–943.
3. Ahn SY, Kim JH, Ha SK, Kim JH, Kwon TH, Park YK, et al. Clinical analysis of risk factors associated with the recurrence of chronic subdural hematoma. *J Korean Neurotraumatol Soc* 7:68-73, 2011
4. Ernestus RI, Beldzinski P, Lanfermann H, Klug N. Chronic subdural hematoma: surgical treatment and outcome in 104 patients. *Surg Neurol* 48:220-225, 1997
5. J.M. Regan, E. Worley, C. Shelburne, R. Pullarkat, J.C. Watson, Burr hole washout versus craniotomy for chronic subdural hematoma: patient outcome and cost analysis, *PLoS One* 10 (2015) e0115085.
6. A.G. Kolias, A. Chari, T. Santarius, P.J. Hutchinson, Chronic subdural haematoma: modern management and emerging therapies, *Nat. Rev. Neurol.* 10 (2014) 570.
7. Yamamoto H, Hirashima Y, Hamada H, Hayashi N, Origasa H, Endo S. Independent predictors of recurrence of chronic subdural hematoma: results of multivariate analysis performed using a logistic regression model. *J Neurosurg* 98:1217-1221, 2003
8. Adhiyaman V, Asghar M, Ganeshram KN, Bhowmick BK. Chronic subdural haematoma in the elderly. *Postgrad Med J* 78:71-75, 2002
9. Mondorf Y, Abu-Owaimer M, Gaab MR, Oertel JM. Chronic subdural hematoma--craniotomy versus burr hole trepanation. *Br J Neurosurg* 23:612-616, 2009
10. Santarius T, Hutchinson PJ. Chronic subdural haematoma: time to rationalize treatment? *Br J Neurosurg* 18:328-332, 2004
11. Lega BC, Danish SF, Malhotra NR, Sonnad SS, Stein SC. Choosing the best operation for chronic subdural hematoma: a decision analysis. *J Neurosurg* 113:615-621, 2010
12. Weigel R, Schmiedek P, Krauss JK. Outcome of contemporary surgery for chronic subdural haematoma: evidence based review. *J Neurol Neurosurg Psychiatry* 74:937-943, 2003
13. Quinones-Hinojosa A. Schmiedek and sweet operative neurosurgical techniques, ed 6. Philadelphia, PA: Elsevier Saunders, 2012.
14. Taussky P, Fandino J, Landolt H. Number of burr holes as independent predictor of postoperative recurrence in chronic subdural haematoma. *Br J Neurosurg* 22:279-282, 2008
15. Wakai S, Hashimoto K, Watanabe N, Inoh S, Ochiai C, Nagai M. Efficacy of closed-system drainage in treating chronic subdural hematoma: a prospective comparative study. *Neurosurgery* 26:771-773, 1990
16. Zakaraia AM, Adnan JS, Haspani MS, Naing NN, Abdullah JM. Outcome of 2 different types of operative techniques practiced for chronic subdural hematoma in Malaysia: an analysis. *Surg Neurol* 69:608-615, 2008
17. Gurelik M, Aslan A, Gurelik B, Ozum U, Karadag O, Kars HZ. A safe and effective method for treatment of chronic subdural haematoma. *Can J Neurol Sci* 34:84-87, 2007
18. Santarius T, Kirkpatrick PJ, Ganesan D, Chia HL, Jalloh I, Smielewski P, et al. Use of drains versus no drains after burr-hole evacuation of chronic subdural haematoma: a randomised controlled trial. *Lancet* 374:1067-1073, 2009
19. Mondorf Y, Abu-Owaimer M, Gaab MR, Oertel JM. Chronic subdural hematoma--craniotomy versus burr hole trepanation. *Br J Neurosurg* 23:612-616, 2009
20. J.M. Regan, E. Worley, C. Shelburne, R. Pullarkat, J.C. Watson, Burr hole washout versus craniotomy for chronic subdural hematoma: patient outcome and cost analysis, *PLoS One* 10 (2015) e0115085.
21. Sudha Ram, K. Visvanathan. Mini-craniotomy for subdural hematoma – Experience in a tertiary care Centre. *Interdisciplinary Neurosurgery* 19 (2020) 100623