

ORIGINAL RESEARCH

Rate of reoperation in patients with chronic subdural hematoma after burrhole evacuation without a subdural drain

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ABSTRACT

Introduction – Burr-hole craniostomy and closed system drainage are widely used in evacuating a chronic subdural hematoma (CSDH). The present study was done to assess the rate of reoperation in patients with chronic subdural hematoma after burrhole evacuation without a subdural drain. **Material & methods-** The present study was done among 100 patients, went for surgical procedure at a tertiary care hospital. Patients were graded with Markwalder's neurological grading system. Level of significance was kept at $p < 0.05$. **Results** – All the operations were uneventful. All the patients were discharged alert and oriented. No incidence of recurrence within 12 months after surgery. **Conclusion-** This study demonstrated that surgical management of unilateral diffuse CSDH in adult patients by burr holes, irrigation are effective and associated with no recurrence.

Keywords – Burr Holes, Recurrence, Reoperation, Subdural Hematoma, Surgery

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INTRODUCTION

In emergency setting, subacute subdural hematoma (SASDH) and chronic subdural hematoma (CSDH) are among the most typical diagnosis needing neurosurgical consultation. Both hematomas are primarily treated surgically in symptomatic patients with burr hole drainage and subdural irrigation. Hematoma recurrence, which frequently necessitates repeat surgical therapy, additional time spent in the hospital, and occasionally higher morbidity and death, is a common consequence following surgical intervention for chronic/subacute subdural hematoma (C/SA-SDH) draining.[1,2]

Three principal surgical procedures are commonly used as follows: twist-drill craniostomy, burr hole, and craniotomy. Many modifications of these procedures have been described; however, none have solved the main problem of CSDH surgery, namely a high recurrence rate. Recurrence of CSDH is usually defined as reaccumulation of hematoma fluid that needs reoperation; defined in this way, the recurrence rate ranges from 0.4% to 33.3%.[3,4] In most studies, the recurrence rate is around 10%.

Burr hole surgery is the main treatment for subdural haematomas that develop a few days or weeks after a minor head injury (chronic subdural

haematomas). During the procedure, one or more small holes are drilled in the skull and a flexible rubber tube is inserted to drain the haematoma. Sometimes the tube may be left in place for a few days afterwards to drain away any blood and reduce the chances of the haematoma coming back. Burr hole surgery is often carried out under general anaesthetic, but is sometimes done under local anaesthetic.[5]

Burr hole surgery is a widely used method still there is no consensus of the needed number of burr holes, the size of the burr hole, the use of irrigation, and the site of the drain whether subdural or subgaleal (also termed subperiosteal). Hence the aim of current study is to assess the rate of reoperation in patients with chronic subdural hematoma after burrhole evacuation without a subdural drain.

MATERIAL & METHODS

In this descriptive cohort study, patients who had CSDH evacuation in the tertiary care hospital in the previous one year were reviewed retrospectively. Ethical permission was taken from the institutional review board. Adult patients (>18 years old) who underwent evacuation of a unilateral diffuse CSDH spanning from the frontal to the occipital bones through two large burr holes (2 cm in diameter) and

irrigation of the subdural region with warm saline matched the inclusion criteria. Patients with persistent thrombocytopenia—defined as pretreatment platelet counts that did not reach 100,000/microliter after platelet transfusions—were excluded from this study. Hundred patients were selected after putting the inclusion and exclusion criteria.

Patient demographics, the cause of the subdural hematoma, preoperative clinical state, laboratory findings, preoperative computed tomography (CT) scan head findings, preoperative preparation, operative details, postoperative management, any complications from surgery, recurrence of CSDH, follow-up CT scan head findings, and the progression notes in the follow-up visits are among the clinical data that were gathered from the patients' charts.

According to "Markwalder's neurological grading system," Grade 0 indicates that a patient is neurologically normal; Grade 1 indicates that a patient is alert and oriented with mild symptoms; Grade 2 indicates that a patient is sleepy or disoriented with

variable neurological deficit, such as hemiparesis; and Grade 3 indicates that a patient is stuporous but responding appropriately to noxious stimuli with multiple focal symptoms.[6] The recurrence of symptomatic ipsilateral subdural reaccumulation with mass effect within a year of surgery was referred to as the RR.

The data collected was entered in Microsoft excel sheets and analyzed using SPSS version 23.0 and results were expressed in the form of frequency, percentage and mean (SD). The level of significance was kept at $p < 0.05$.

RESULTS

Table 1 shows the demographic characteristic of patients and it was found that the mean age of patients was 68.7 ± 3.2 years, the number of males were 68% and females were 32%. The most common comorbidity present was hypertension (50%) followed by diabetes (30%). 48% subjects had history of head trauma within 8 weeks of admission.

Table 1 showing demographic characteristic of patients

Variable		Number of patients (%)
Age (in years)		68.7 ± 3.2
Gender	Female	32
	Male	68
Comorbidity	Hypertension	50
	Diabetes	30
	Cirrhosis	10.6
	Ischemic heart disease	4.3
	Aneamia	5.1
Coagulopathy	Antiplatelets	32.1
	Thrombocytopenia	11.6
	INR >1.4	8.3
	History of head trauma within 8 weeks of admission	48

Table 2 shows distribution of patients according to Markwalder's grades on admission and it was found that maximum subjects were in grade 2 (44%) and least were in the category of grade 4 (4%).

Table 2 shows distribution of patients according to Markwalder's grades

Markwalder's grades	Percentage
Grade 0	0
Grade 1	36
Grade 2	44
Grade 3	16
Grade 4	4

Table 3 shows the clinical characteristics of patients post operation and it was found that 6% developed generalized seizures. The CT scan head 2 weeks after discharge revealed a decrease in the subdural space compared with that done in the 5th postoperative day in all patients with a mean thickness of 0.7 cm. The

Table 3 shows clinical characteristic of patients post surgery

Variable	Frequency
Seizures	6%
Mean subdural space (cm)	0.7
Mean hospital days (days)	11
Mortality rate	0%

hospitalization period ranged between 7 days and 19 days with a mean duration of 11 days. The mean follow-up period was 21 months. No incidence of recurrence within 12 months after surgery in this study. The mortality rate 12 months after surgery was 0%.

Recurrence rate	0%
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DISCUSSION

The present study was done to assess the rate of reoperation in patients with chronic subdural hematoma after burrhole evacuation without a subdural drain. Combining the following steps together, like burr holes, the size of burr hole, the irrigation of the subdural space by warm saline, this all lead to 0% recurrence rate in this study within 1 year of surgery. All the patients improved to Markwalder's Grade 0 within 3 weeks after surgery. All of the participants in this trial had a sufficient evacuation of the CSDH and did not experience the development of a subsequent acute subdural or intracerebral hematoma. Although CSDH is a common neurosurgical condition, there is still no agreement on the best surgical steps between various neurosurgical centres and among neurosurgeons within the same centre, including the quantity or size of burr holes, the use of irrigation, and the kind of irrigating fluid.[7-10]

Staniic et al discovered that the RR was 16% (17/107 patients) in the first three months following the evacuation of CSDH with a single burrhole and drainage, although they also included unilateral and bilateral instances and did not specify the location of the employed drain.[11]

In a retrospective analysis of subdural drain use following burr hole drainage for CSDH, Taylor et al. discovered that the subdural drain group's 6-month reoperation rate was 8.1% (10/123). Only 62.6% of patients in their study had two burr holes, and only 21.1% of cases were bilateral.[12]

After CSDH was evacuated by a single burr hole (16 mm in diameter) and subgaleal closed system drainage at low negative pressure, Yadav et al. discovered that the RR was 3.57% (5/140 patients).[13]

After evacuating CSDH, Chih et al. conducted a prospective comparative study comparing subperiosteal and subdural drains, and they found that the reoperation rate was 6.7% for subperiosteal drains and 3.3% for subdural drains. They employed no suction force and only drilled one burr hole that was around 10 mm in diameter.[14]

The burr holes enabled effective subdural hematoma irrigation and allowed for appropriate subdural hematoma evacuation. Large burr holes allow for a wide incision of the dura, which allowed for effective CSDH evacuation and improved bleeding point management by making it easier to see bleeding from the deep dura surface and subdural membranes. Due to the size of the burr holes, there may be a cosmetic drawback. Although the insertion of a subdural catheter is thought to be safe, there are several possible risk factors that could be present, including iatrogenic acute subdural hematoma and intracerebral damage from malposition[15,16]

According to Oral et al., both subdural and subgaleal drains have a low risk of CSDH recurrence. They also noted that the subgaleal draining system is comparatively less invasive, safe, and technically simple, making it appropriate for older patients and individuals at higher risk.[17] The majority of research discovered the importance of irrigation in lowering the RR of CSDH following burr hole evacuation.[18,19]

This study's limitation include its retrospective design, small patient population, and lack of a control group.

CONCLUSION

This study demonstrated that surgical management of unilateral diffuse CSDH in adult patients by burr holes, irrigation, effective and associated with no recurrence.

REFERENCES

1. Abdelfatah MA: Recurrence rate of chronic subdural hematoma after evacuating it by two large burr holes, irrigation, and subgaleal low-pressure suction drainage. *Asian J Neurosurg.* 2019; 14:725-9.
2. Suzuki K, Sugita K, Akai T, Takahata T, Sonobe M, Takahashi S: Treatment of chronic subdural hematoma by closed-system drainage without irrigation. *Surg Neurol.* 1998; 50:231-4.
3. Kotwica Z, Saracen A, Dziuba I: Chronic subdural hematoma (CSH) is still an important clinical problem. analysis of 700 consecutive patients. *TranslNeurosci.* 2019; 10:260-3.
4. Gazzeri R, Laszlo A, Faiola A, Colangeli M, Comberiati A, Bolognini A, Callovin G: Clinical investigation of chronic subdural hematoma: relationship between surgical approach, drainage location, use of antithrombotic drugs and postoperative recurrence. *ClinNeurolNeurosurg.* 2020: 191.
5. Shim YW, Lee WH, Lee KS, Kim ST, Paeng SH, Pyo SY. Burr hole drainage versus small craniotomy of chronic subdural hematomas. *Korean J Neurotrauma.* 2019; 15:110-6.
6. Markwalder TM, Steinsiepe KF, Rohner M, Reichenbach W, Markwalder H. The course of chronic subdural hematomas after burr-hole craniostomy and closed-system drainage. *J Neurosurg.* 1981;55:390-6.
7. Chandran RS, Nagar M, Sharmad MS, Prabhakar RB, Peethambaran AK, Kumar S, et al. Single parietal burr-hole craniostomy with irrigation and drainage for unilateral chronic subdural hematoma in young adults<40 years.A rationale behind the procedure. *J Neurosci Rural Pract* 2017;8:389-94.
8. Han HJ, Park CW, Kim EY, Yoo CJ, Kim YB, Kim WK, et al. One vs. Two burr hole craniostomy in surgical treatment of chronic subdural hematoma. *J Korean NeurosurgSoc* 2009;46:87-92.
9. Iftikhar M, Siddiqui UT, Rauf MY, Malik AO, Javed G. Comparison of irrigation versus no irrigation during burr hole evacuation of chronic subdural hematoma. *J NeurolSurg A Cent EurNeurosurg* 2016;77:416-21.
10. Adachi A, Higuchi Y, Fujikawa A, Machida T, Sueyoshi S, Harigaya K, et al. Risk factors in chronic subdural hematoma: Comparison of irrigation with

- artificial cerebrospinal fluid and normal saline in a cohort analysis. *PLoS One* 2014;9:e103703.
11. Stanišić M, Pripp AH. In reply: A reliable grading system for prediction of chronic subdural hematoma recurrence requiring reoperation after initial burr-hole surgery. *Neurosurgery* 2017;81:E78-9.
 12. Tailor J, Fernando D, Sidhu Z, Foley R, Abeysinghe KD, Walsh DC, et al. Clinical audit effectively bridges the evidence-practice gap in chronic subdural haematoma management. *Acta Neurochir (Wien)*. 2017;159:627-31.
 13. Yadav YR, Parihar V, Chourasia ID, Bajaj J, Namdev H. The role of subgaleal suction drain placement in chronic subdural hematoma evacuation. *Asian J Neurosurg* 2016;11:214-8.
 14. Chih AN, Hieng AW, Rahman NA, Abdullah JM. Subperiosteal drainage versus subdural drainage in the management of chronic subdural hematoma (A comparative study). *Malays J Med Sci* 2017;24:21-30.
 15. Pavlov V, Bernard G, Chibbaro S. Chronic subdural haematoma management: An iatrogenic complication. Case report and literature review. *BMJ Case Rep* 2012;2012.
 16. Chan KW, Datta NN. Iatrogenic acute subdural hematoma due to drainage catheter. *Surg Neurol*. 2000;54:444-6.
 17. Oral S, Borklu RE, Kucuk A, Ulutabanca H, Selcuklu A. Comparison of subgaleal and subdural closed drainage system in the surgical treatment of chronic subdural hematoma. *North ClinIstanb* 2015;2:115-21.
 18. Ishibashi A, Yokokura Y, Adachi H. A comparative study of treatments for chronic subdural hematoma: Burr hole drainage versus burr hole drainage with irrigation. *Kurume Med J*. 2011;58:35-9.
 19. Jang KM, Kwon JT, Hwang SN, Park YS, Nam TK. Comparison of the outcomes and recurrence with three surgical techniques for chronic subdural hematoma: Single, double burr hole, and double burr hole drainage with irrigation. *Korean J Neurotrauma*. 2015;11:75-80