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Original Research Article

OUR INSTITUTIONAL EXPERIENCE COMPARING THE USE OF DRAINS VERSUS NO DRAINS FOLLOWING BUR HOLE SURGERY FOR CHRONIC SUBDURAL HEMATOMA (SDH)

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ABSTRACT

Background: A chronic subdural hematoma (SDH) is a collection of liquefied blood in the subdural space that persists for more than three weeks. This condition most commonly affects elderly individuals and often occurs after a minor fall or in association with certain medical conditions. There are several surgical techniques available for treating chronic SDH. The burr hole technique is considered a simple, safe, and effective procedure that requires less time and has better surgical outcomes. This study aimed to evaluate the outcomes of a two-burr hole craniostomy with or without subdural drain placement.

Materials and Methods: This retrospective observational study took place at MGM Medical College from November 2022 to August 2024. 50 patients with clinically and radiologically diagnosed chronic subdural hematoma, requiring surgery, were included. Burr hole Craniostomy was performed on all patients. Subdural drain insertion was done after chronic SDH evacuation in 30 patients (Group A), while no subdural drain was placed in the remaining 20 patients (Group B), based on the surgeon's preference and belief. This study investigated demographic data, etiology, clinical presentation of chronic SDH, and post-operative complications after Burr hole surgery. Complications were analyzed separately for Group A and Group B, and both groups were compared. Follow-up ranging from 3 weeks to 6 months was conducted to monitor late complications in both groups. Data analysis was performed using SPSS version 23.0 for Windows. Fisher's exact test was used to calculate the two-tailed P value for significance between the two groups. Two-tailed P values less than 0.05 were considered significant ($P<0.05$).

Results: The mean age group in our study was 60.6 +/- 10.224 years with male preponderance. The most common cause of chronic subdural hematoma in our study was attributed to trauma in 28(56%) patients. The most common clinical symptom noted in our study was a headache and hemiparesis. When the complications were compared in between Group A patients and Group B, it was found that the incidence of recurrent/residual SDH and deep infections were reduced with the use of subdural drains while the incidence of pneumocephalus, post-operative seizures, and intracerebral hematoma was more with use of drain and the results were statistically significant ($P<0.05$).

Conclusion: The use of a subdural drain after surgery not only prevents the recurrence of chronic subdural hematoma but also reduces the incidence of late deep surgical infections at the operative site. This helps to prevent prolonged hospital stays, the need for redo surgery and is cost-effective. However, a few complications that may occur with the use of drains can be managed effectively by conservative management.

Keywords: Burrhole, Surgery, chronic subdural hematoma, Subdural drain.

INTRODUCTION

A chronic subdural hematoma (SDH) is a collection of liquefied blood in the subdural space, that has been present for more than three weeks.[1] The annual incidence of CSDH is about 1-5.3 cases per 1,00,000 population.[2] The treatment for chronic subdural hematoma is considered highly beneficial in neurosurgical practice. It is mostly present in elderly people after a trivial fall or with associated medical diseases requiring recurrent haemodialysis, anticoagulant, and/or antiplatelet therapy.[3] Various surgical techniques have been utilized in the past, and there are differing opinions and practices among different medical institutions. Currently, there is no consensus on the optimal management and no established guidelines. Treatment methods include twist drill and aspiration, burr-hole craniostomy with or without subdural drain, single versus two burr-hole craniostomy, craniotomy, Endoscopic-assisted evacuation, and newly introduced endovascular technique of Middle Meningeal artery embolization.[4,5] This study was undertaken to understand the outcomes of two burr hole craniostomy with or without subdural drain placement, addressing both radiological and symptomatic recurrence.

MATERIAL AND METHODS

The Retrospective observational study was conducted at the Department of Neurosurgery, MGM Medical College from November 2022 to August 2024. A total of 50 patients, admitted at MGM-SSH hospital, fulfilling the inclusion criteria with chronic subdural hematoma were included.

Inclusion Criteria

1. Patients with radiologically and clinically confirmed chronic subdural hematoma (SDH) indicating surgery.
2. Patients of all age groups who consented to Burr hole craniostomy.
3. Patients of unilateral Chronic SDH.

Exclusion Criteria

1. Patients in whom Burr hole Craniostomy was converted to Craniotomy.
2. Patients who died and were lost to follow-up."
3. Patients with ipsilateral hematomas who had undergone cerebrospinal fluid diversion within 6 months of presentation

A clinical history and examination were noted from the patient's old file records in all cases. Since, the study was retrospective, and we studied only records, ethical approval was not required. All patients underwent preoperative and postoperative CT brain plain. Most of the patients were in a Glasgow Coma Scale 9-15. Based on clinical examination and radiological findings, Chronic SDH was diagnosed and patients underwent burr hole craniostomy. The patients underwent surgery under local anaesthesia with the placement of two burr holes, one in the frontal region and the second in the parietal region. Dura was coagulated and opened widely. The outer membrane was perforated to drain subdural fluid, and the residual collection was evacuated with copious irrigation of normal saline until effluent fluid burr holes were clear. The subdural drain was placed on the surgeon's preference and belief. Post-operatively, the patient received adequate hydration in a supine position with high-flow oxygen for 48 hours. In, 30 patients sub-dural drain was inserted (labelled as group A), while in the rest 20 patients no sub-dural drain was placed (labelled as group B). Post-operatively, all patients underwent CT brain plain after 48 hours to look for residual or recurrent chronic SDH. All patients were followed in OPD for 6 months after discharge (initially every week for the first month and thereafter once a month for the next 5 months), radiologically and clinically to look for recurrence. "Recurrence" was defined as the occurrence of symptoms and signs attributable to an ipsilateral hematoma seen on a computed tomographic scan within 6 months of the original drainage procedure. Early recurrence was defined as chronic SDH collection seen within 3 weeks and late recurrence was defined from 3 weeks to 6 months. Drains were removed on 3rd postoperative day in most of the patients. Demographic, clinical, and radiological parameters were recorded. Data were analysed by using the SPSS version 23.0 for Windows. The outcomes were noted in the form of radiological and symptomatic recurrence in both the drain (Group A) and no-drain groups (Group B). Fisher's exact test was used to calculate the two-tailed P value for significance between the two groups. Two-tailed P values less than 0.05 were considered significant ($P<0.05$). Also, the Chi-square test and degree of freedom were calculated. The mean+/- SD was used to calculate numerical variables.

RESULTS

Most of the patients presented to us were in the 61-80 age group, accounting for 56%, as shown in Table no1. The mean age group in our study was 60.6+/-10.224 years. [Table 1]

Most of the patients were males, accounting for 80% as shown in Table no 2. [Table 2]

Table 1: Age Group Distribution

Sr. No	Age Group (in years)	No of patients	percentage
1	0-20	0	0
2	21-40	2	4%

3	41-60	20	40%
4	61-80	28	56%
Mean Age +/- SD = 60.6 +/-10.224			

Table 2: Sex group distribution

Sr no	Sex	No of patients	% of population
1	Male	40	80%
2	Female	10	20%

Table 3: Aetiology

Sr.no	Etiology	No of Patients	Percentage
1	Trauma	**28**	**56%**
2	Coagulopathy/Anticoagulants	**7**	**14%**
3	Alcoholism	**15**	**30%**
4	Others (Seizure disorder, conditions associated with intracranial hypotension, etc.)	**0**	**0**

Table 4: Clinical Presentation

Sr. No	Symptoms	No of patients	Percentage
1	Headache	30	60%
2	Vomiting	12	24%
3	Altered Sensorium	20	40%
4	Hemiparesis	22	44%
6	Seizures	8	16%
7	Other complaints (Urinary incontinence, dementia, etc)	6	12%

Table 5: Table shows Patients with Drain vs. No-Drain after Burr hole surgery

Sr no	Drain Versus No Drain	No of patients
1	Drain inserted	30
2	No Drain	20

Table 6: Post-operative Complications

Sr.no	Complications	Patients with Drain N = 30	Patients with No-Drain N = 20
1	Residual/Recurrent SDH (up to 3 weeks)	0/30 (0)	2/20 (10%)
2	Pneumocephalus	8/30 (26.66%)	4/20 (20%)
3	Deep infections (Subdural empyema, Meningitis)	0/30 (0)	1/20 (5%)
4	Intracerebral Hematoma	2/30 (6.6%)	0/20 (0)
5	Post-operative seizures	4/30 (13.33%)	2/20 (10%)

Table 7: Follow-up (3 weeks to 6 months)

Sr. no	Insertion of Drain	Recurrence present	Recurrence Absent	P < 0.05 (Significant)
1	**Drain placed**	3/30 (10%)	27/30 (90%)	{The chi-squared value is 24.445, with 1 degree of freedom}
2	**Drain not placed**	8/20 (40%)	12/20 (60%)	

DISCUSSION

Chronic subdural hematoma (CSDH) is one of the most common types of intracranial hematoma and often occurs in older individuals. It is a frequently encountered condition in everyday neurosurgical practice. Older people are at particular risk of CSDH because the brain atrophies with age (due to brain cell death). Most CSDHs are probably caused by head injury. Many patients have a history of trivial trauma. Other predisposing factors include chronic alcoholism, coagulopathy, use of anticoagulants, intracranial hypotension (idiopathic or secondary to shunt over-drainage, CSF leak, repeated lumber punctures), and seizure disorders.[6]

Most patients presented to us were in the 61 to 80 age group, accounting for 28 (56%) patients, as shown in Table no1. The mean age group in our study was 60.6 +/- 10.224 years. The mean age group reported in our study was close to the mean age group of 64.45 years reported by Sharma A. et al,[1] Most of the patients were male (as shown in Table no 2), accounting for 80% of patients. Male preponderance was also reported in the study by Ernestus RI et al.[7]

The most common cause of chronic subdural hematoma in our study was attributed to trauma in 28(56%) patients (as shown in Table no 3), same was also reported in the study by Chen JC and Levy ML.[8] Other causes were alcoholism in 15 (30%) patients and use of anticoagulants or coagulopathy in 7(14%) patients. Old age and chronic alcoholism

causes brain atrophy which increases the chances of SDH.[9]

The most common clinical presentation noted in our study was a headache, accounting for 60%, and hemiparesis 44% of all symptoms. The other symptoms were altered sensorium, vomiting, seizures, and other associated complaints like urinary incontinence and dementia. All the patients reported to us were in GCS between 9 -15 and all were improved to GCS 15 after surgery. Headache and hemiparesis as the most common presenting complaint in 67 % of patients was also reported in the study by Velappan DP Palaniappan PN and Pandian A .[10]

In our study, a total of 50 patients of chronic SDH, clinically and radiologically proven with a surgical indication were operated by Burr hole surgery. The patients underwent surgery under local anesthesia with the placement of two burr holes, one in the frontal region and the second in the parietal region. Dura was coagulated and opened widely. The outer membrane was perforated to drain subdural fluid, and the residual collection was evacuated with copious irrigation of normal saline until effluent fluid burr holes were clear. The subdural drain was placed on the surgeon's preference and belief. Out of 50 patients, the Subdural drain after burr-hole surgery was inserted in 30 patients (60%) and in the rest 20 patients (40%) no sub drain was inserted as shown in Table no 5.

Repeat post-operative CT Brain Plain was done in all patients within 24 to 48 hours to look for residual/recurrent Chronic SDH collection, Pneumocephalus, and other complications like intracerebral hematoma, etc. All the postoperative complications like early residual/recurrent SDH within 3 weeks and late from 3 weeks to 6 months, pneumocephalus, deep infections (subdural empyema, Meningitis), seizures, and surgical site infection were compared between groups A and B. Subdural drains were removed in most of the patients on 3rd postoperative day. In patients with residual/recurrent SDH, Re-exploration and retaping of collection was done from the same borehole.

When the complications were compared in between Group A patients with Drain and Group B without Drain, it was found that the complications like early and late recurrent/residual SDH and deep infections in patients of Group B without drain were much more as compared to Group A patients, while the incidence of Pneumocephalus, post-operative seizures, and intracerebral hematoma was more in group A patients with drain and the results were statistically significant. (P<0.05) (shown in Tables 6 and 7).

Thus, the use of a subdural drain in chronic Burrhole surgery prevents the occurrence of residual/recurrent SDH and Deep infections. While, it increases complications like pneumocephalus, intracerebral hematoma and post-operative seizures. However, these complications can be managed conservatively without redo surgery. In our experience, we have found that using a soft, flexible drain made of silicon, such as an EVD, can reduce the incidence of intracerebral hematoma compared to using a hard drain like an infant feeding tube made of PVC material.

After discharge, all patients were followed up for 6 months clinically and with repeat CT scans if required, initially once a week for the first month and thereafter every month for the next 5 months. We found that late residual/recurrent chronic SDH in patients of group A with Drain was less as compared to Group B without drain (Statistically significant<0.05) as we have discussed same above. (Shown in table no 7).

Our study results were comparable to those of Wakai et al., who reported recurrence rates of 5% for the drain group and 33% for the non-drain group; Tsutsumi et al. reported rates of 3.1% in the drain group and 17% in the non-drain group; and Santarius et al., who reported recurrence rates of 9.3% in the drain group and 24% in the non-drain group for chronic subdural hematoma.[11,12,13] However, our findings contrasted with the study by Velappan DP,[10] who reported a higher incidence of pneumocephalus in the no-drain group, approximately 50%, while in our study, the incidence of pneumocephalus was higher in the drain group (Group A) about 26.66%.

CONCLUSION

In chronic subdural hematoma (SDH) surgery, burr hole craniostomy is a simple, safe, less time-consuming, and cost-effective procedure. The use of a subdural drain after the surgery not only prevents the recurrence of chronic SDH but also reduces the chance of late deep surgical infections at the operative site. This helps to prevent prolonged hospital stays, the need for redo surgery, and is cost-effective. However, a few complications that may occur with the use of drains can be managed conservatively.

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