

Original Research Article

BURR-HOLE EVACUATION UNDER LOCAL ANAESTHESIA IN CHRONIC SUBDURAL HEMATOMA: OUTCOMES AND CLINICAL IMPLICATIONS

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ABSTRACT

Background: Chronic subdural hematoma (CSDH) is a common neurosurgical condition, particularly in the elderly, associated with significant morbidity. Burr-hole evacuation is the preferred surgical treatment, and its performance under local anaesthesia (LA) offers additional advantages in high-risk patients by avoiding the risks of general anaesthesia. This study evaluates the outcomes of burr-hole evacuation performed under LA in patients with CSDH. **Materials and Methods:** This retrospective study included 74 patients diagnosed with CSDH who underwent burr-hole evacuation under LA between January 2015 and December 2024. Clinical presentation, radiological findings, intraoperative details, and postoperative recovery were analysed. Outcomes were assessed in terms of neurological improvement, recurrence, complications, and mortality. **Result:** A total of 74 patients, with a mean age of 62.62±14.39 years, were studied, which included 60 males and 14 females. Headache, motor weakness, and dizziness were the most common presenting symptoms. Radiologically, a unilateral hematoma was observed in 85% and a bilateral one in 15%. The mean operative time was 59.081 minutes with minimal blood loss. Neurological improvement was seen in 99% of patients within 48–72 hours. Recurrence was noted in 2.70% of cases, requiring reoperation. Postoperative complications included pneumocranium (80%, but none had tension pneumocranium), restlessness (54.05%), wound infection (1.35%), and seizures (1.35%). There was a low perioperative mortality (1.35%). **Conclusion:** Burr-hole evacuation under local anaesthesia is a safe, effective, and well-tolerated procedure for the management of CSDH, particularly in elderly and comorbid patients. It provides favourable neurological outcomes with low recurrence and minimal morbidity, making it a valuable alternative to general anaesthesia in selected cases.

INTRODUCTION

Chronic subdural hematoma (CSDH) represents one of the most common neurosurgical entities, particularly affecting the elderly, with an annual incidence ranging from 8 to 58 cases per 100,000 individuals.^[1] It typically follows minor head trauma that causes rupture of the bridging veins, with symptoms often appearing insidiously weeks later as the hematoma gradually enlarges. Clinically, patients may present with headache, cognitive decline, motor deficits, or altered sensorium.^[2]

Burr-hole evacuation remains the gold standard for management, offering prompt decompression and favourable outcomes with relatively low morbidity.^[3] Although conventionally performed under general anaesthesia (GA), increasing evidence highlights the merits of local anaesthesia (LA)—notably in elderly patients with multiple comorbidities who are particularly vulnerable to anaesthesia-related risks.^[4] This study aims to evaluate the safety and efficacy of burr-hole evacuation under local anaesthesia, with an emphasis on neurological recovery, recurrence rates, and postoperative complications.

MATERIALS AND METHODS

Study Design and Setting

This retrospective observational study was conducted at a tertiary care teaching institute in western India over ten years, from January 2015 to December 2024. Ethical clearance was obtained from the Institutional Ethics Committee IEC/BU/2025/Ex. 16/42/2025, and informed consent was secured from all participants or their caregivers before inclusion in the study.

Patient Selection

Inclusion criteria were:

- Patients aged ≥ 18 years diagnosed radiologically with CSDH.
- Patients undergoing burr-hole evacuation under LA.

Exclusion criteria were:

- Patients requiring craniotomy due to acute-on-chronic hematoma or organised clot.
- Patients with coagulopathy uncorrectable prior to surgery.
- Patients who were restless and agitated pre-surgery, and were deemed very likely to be uncooperative for the procedure under LA
- Patients with a Glasgow Coma Score < 13

Surgical Technique

All patients were operated under LA, and sedation with Fentanyl was used as and when required. After scalp infiltration with a solution of 2% lignocaine with adrenaline, diluted with normal saline 1:1, one burr-hole was placed over the parietal eminence, and a second burr hole was placed over the ipsilateral frontal region. The hematoma was evacuated by irrigation with warm saline, and a closed-system subdural drain was left in situ for 24–48 hours.

Data Collection and Analysis

Demographic details, presenting symptoms, radiological findings, operative details, and complications were recorded. Outcomes were assessed based on postoperative neurological recovery, average duration and cost of surgery, recurrence requiring reoperation, and mortality. Data were analysed using descriptive statistics.

RESULTS

A total of 74 patients diagnosed with chronic subdural hematoma underwent burr-hole evacuation under local anaesthesia (LA). The demographic

characteristics of the cohort are summarised in Table 1. The mean age of patients was 62.62 ± 14.39 years, with a male-to-female ratio of 30:7. The mean preoperative GCS was 14.20 ± 0.65 , the mean hematoma volume measured 70.50 ± 14.50 mL, and the average CT density was 34.85 ± 7.40 HU.

Table 2 outlines the comorbidities and risk factors observed in the study population. The most prevalent factors included use of antiplatelets (Aspirin alone or in combination with Clopidogrel) (67.56%), hypertension (63.51%), diabetes mellitus (50.00%), and cardiac disease (16.21%). Notably, 70.27% of patients had multiple coexisting comorbidities.

As presented in Table 3, the common preoperative clinical manifestations were headache (54.05%), motor weakness (40.50%), dizziness (40.50%), dysphasia (33.78%), altered sensorium (13.15%), and seizures (6.75%).

Table 4 details the operative findings and postoperative outcomes:

- Mean operative time: 59.08 minutes
- Mean intraoperative blood loss: < 50 mL
- Radiological findings: Unilateral hematoma in 85% and bilateral in 15%; a midline shift > 5 mm was noted in 30% of patients
- Postoperative care: 27.02% required ICU admission (mainly for observation due to comorbidities and advanced age), with a mean ICU stay of 2.95 days; the mean hospital stay was 4.5 days, and most patients achieved mobilisation by the fourth post-operative day; none required ventilatory support
- Cost analysis: Procedures involving ICU admission incurred substantially higher costs than those managed without ICU care
- Neurological recovery: 99% of patients exhibited marked improvement within 24 hours postoperatively
- Drainage management: The average drain retention time was 48 hours
- Recurrence: 2 patients (2.70%) developed recurrence necessitating reoperation
- Mortality: 1 patient succumbed postoperatively

Table 5 summarises the postoperative complications. The most frequently observed issue was pneumocranium, while restlessness, seizures, vomiting, and wound-related complications occurred in a minor proportion of patients.

Table 1: Demographic characteristics

Serial No	Variables	Cases (N 74)
1	Age (years) mean (SD)	62.62 $\pm$ 14.39
2	Sex: Male Female	60 14
3	GCS Score (SD)	14.20 $\pm$ 0.65
4	Volume of haematoma (ml) Mean (SD)	70.5 (14.50)
5	CT value Mean (SD)	34.85 $\pm$ 7.40

Table 2: Comorbidities and risk factors prevalent among the cases

Serial No	Variables	Cases (N 74)	%
1	Antiplatelets	50	67.56
2	Diabetes Mellitus	37	50.00
3	Heart disease/Heart surgery	12	16.21
4	Pulmonary disease	1	1.35
5	History of stroke	5	6.75
6	Renal disease	2	2.70
7	Thyroid disorders	5	6.75
8	Epilepsy	2	2.70
9	Hypertension	47	63.51
10	Obesity	25	33.78
11	Substance abuse	20	27.02
12	Benign Prostatic Hyperplasia	3	4.05
13	Thrombocytopenia	2	2.70
14	Dengue	1	1.35
15	Encephalitis	1	1.35
16	Invasive lobular carcinoma	1	1.35
17	Multiple comorbidities	52	70.27

Table 3: Spectrum of symptomatology among the patients

Serial No	Variables	Cases (No)	%
1	Nausea/vomiting	3	4.05
2	Seizures	5	6.75
3	Altered consciousness	10	13.15
4	Motor weakness	30	40.54
5	Headache	40	54.05
6	dysphasia	25	33.78
7	Dizziness	30	40.54

Table 4: Clinical outcome among the cases

Serial No	Variables	Cases N (74)	%
1	Average duration of surgery (minutes)	59.081	
2	Average duration of anaesthesia (minutes)	59.081	
3	Patients requiring ICU support	20	27.02
4	Average ICU stay (days)	2.95	
5	Patients requiring ventilator support	0	0
6	Average hospital stays (days)	4.5	
7	Average cost of surgery with ICU stays (rupees)	104,337.30	
8	Average cost of surgery without ICU stays (rupees)	68,175.22	
9	Average retention time of the head drainage tube (hours)	48	
10	Total cases of residual haematoma	2	2.70
11	Mortality	1	1.35

Table 5: Postoperative Complications among the cases

Serial No	Variables	Cases (N 74)	%
1	Vomiting	5	6.75
2	Restlessness	40	54.05
4	Convulsions	1	1.35
6	Pneumocranium	59	79.72
7	Intracranial infection	0	0
8	Poor wound healing	1	1.35
	Total	48	64.86

DISCUSSION

The findings of this study reaffirm that burr-hole evacuation under local anaesthesia (LA) is a safe, effective, and well-tolerated treatment modality for chronic subdural hematoma (CSDH)—particularly in elderly or high-risk patients. By obviating the need for general anaesthesia (GA), this approach minimises perioperative cardiopulmonary risks, enables real-time neurological assessment during surgery, and facilitates faster postoperative recovery.^[4,5]

In our series, the recurrence rate was 2.70%, which is notably lower than the 5–15% recurrence rate

reported in most published studies.^[6] The complication profile was similarly favourable, limited to minor, manageable events such as restlessness, pneumocranium, and transient seizures. The single mortality observed was attributed to underlying systemic comorbidities rather than surgical or anaesthetic factors—further underscoring the suitability of LA for physiologically fragile patients.

Previous studies have consistently supported these observations. Weigel et al. reported comparable recurrence rates between LA and GA, with significantly reduced perioperative morbidity in the LA group.^[7] Likewise, Kotwica and Brzeziński

documented excellent outcomes in elderly patients managed under LA, with a marked reduction in cardiopulmonary complications.^[8]

Taken together, the evidence suggests that the choice of anaesthesia should be individualised, considering the patient's comorbidities and operative risk. For patients with cardiovascular or pulmonary compromise, LA offers distinct advantages—combining safety, efficacy, and expedited recovery. In summary, this study reinforces that burr-hole evacuation under local anaesthesia remains a reliable and pragmatic approach for managing CSDH, delivering favourable outcomes even in patients with significant systemic vulnerabilities.

CONCLUSION

Burr-hole evacuation under local anaesthesia is a safe, effective, and well-tolerated procedure for the management of chronic subdural hematoma. It offers comparable recurrence rates to GA while minimising anaesthesia-related risks, making it an excellent option for elderly and comorbid patients.

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