

Original Research

Recurrence Rate After Using Subdural Drain in Patients with Chronic Subdural Hematoma

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ABSTRACT

Objective: One of the most often carried out procedures in the neurosurgical field is the drainage of chronic subdural hematomas (CSDHs). According to Scotti, subdural hematoma was identified radiologically as a subdural collection that was hypodense to parenchyma and manifested 21 days following trauma. This definition was based on the CT scan. In this study, we want to find the effectiveness of subdural drain in managing chronic subdural hematoma from the perspective of recurrence in our setup.

Materials and Methods: After the procedure, the patients were admitted to the ward for 48 hours and the drain was removed after 48 hours. Then the patients were discharged and follow-up was taken one month for diagnosis of recurrence. Recurrence was labeled positive if postoperative symptomatic recurrence of hematoma that needs re-operation of any type within one month of primary surgery.

Results: Among 85 patients mean age was 51 years with a standard deviation ± 7.55 . 60(71%) patients were male and 25(29%) patients were female. Moreover ≤ 10 (12%) patients had recurrence while 75(88%) patients didn't have recurrence.

Conclusion: According to our research, patients with Chronic Subdural Hematoma (CSDH) had a 12% recurrence incidence following the placement of a subdural drain.

Keywords: Burr-Hole Craniostomy, Subdural Drain, Chronic Subdural Hematoma, Reoperation Rate.

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Date of Submission: 10-09-2023

Date of Revision: 12-12-2023

Date of Acceptance: 28-12-2023

Date of Online Publishing: 31-12-2023

Date of Print: 31-12-2023

DOI: 10.36552/pjns.v27i4.934

INTRODUCTION

One of the most often carried out procedures in neurosurgical practice is the drainage of chronic subdural hematomas (CSDHs).¹ According to Scotti, subdural hematoma was identified radiologically as a subdural collection that was hypodense to parenchyma and manifested 21 days following trauma. A positive history of head injury was described by 25–70% of the patients, but no history of head injury was reported by 25–48% of

the patients. Antithrombotic medication and falls are the two most common risk factors for CSDH.² The general incidence of CSDH, estimated at 1.72 to 20 per 100000 persons per 3 years, is on the rise because of aging populations and the extensive use of blood thinners and anti-coagulant drugs.⁴ Though there is still disagreement on the pathogenesis, management approach, and surgical treatment of CSDH, it is a medical entity with declining morbidity and death, particularly with the introduction of Computed tomography (CT) and improvements in operative skills. The burr-hole and closed drainage method is regarded as a low-threshold, minimally invasive intervention with low risk in clinical practice. It has been found that the recurrence rate of CSDH varies between 2.3% and 33%.⁵

The optimum surgical method and the best pre-and postoperative care are still up for debate, as are the risk factors for recurrence.⁶ The clinical manifestation of CSDH is frequently subtle. Reduced consciousness, headache, ataxic gait, memory loss or cognitive dysfunction, motor impairment (e.g., hemi paresis), headache, and aphasia are among the symptoms. When it comes to smaller hemorrhages, MRI is the preferred study method; nevertheless, for larger hemorrhages, a CT scan of the brain is the inquiry of choice because it may show both acute hemorrhage and skull fractures, and it can be obtained quickly.⁷

Treatment options for Chronic Subdural Hematoma (CSDH) include conservative measures or surgical intervention recommended when symptoms of compression and brain herniation manifest. The preferred surgical procedures are typically thought to be twist drill, burr-hole, or craniostomy, without or with drain insertion. Recurrence rates following surgical evacuation could be anywhere between 5% and 30%.⁸ There is ongoing discussion on the risk factors for recurrence and no universal agreement on the better surgical technique or the best pre-and postoperative care.⁹ The impact of recurrences after surgical treatment of a CSDH on the overall

fatality rate is likewise a contentious issue.¹⁰ This study's goal is to determine the postoperative recurrence rate of CSDH that was removed utilizing a subdural drain and a single burr hole craniostomy with closed system drainage.

MATERIALS AND METHODS

Study Design & Setting

This Cross-sectional study was carried out at the Department of Neurosurgery, Department of Neurosurgery, Lady Reading Hospital, Peshawar for months from 2/2/2022 to 2/8/2022.

Sample Size & Technique

The total sample size was 85. Our assumptions were a 95% confidence interval and 7% margin of error. We considered Consecutive (non-probability) sampling.

Inclusion Criteria

The study involved patients of any gender, aged between 18 to 60 years having chronic subdural hematoma with a baseline Glasgow coma scale of 12 or less than 12.

Exclusion Criteria

Recurrent cases of CSDHs on history. Patients with co-morbid conditions (cardiac patients, hematological disorder, pulmonary disease patients. Diagnosed on ECG, Echo, X-ray chest, PT/APTT.BT/CT), Patient's patient with associated brain contusion and subdural Emphysema diagnosed on CT.

Data Collection

The aforementioned study was conducted with prior authorization from the hospital's ethical council. Every patient who satisfied the inclusion requirements was added to the research., A detailed history, clinical examination, and

radiological investigation were performed as per hospital protocol. All the included patients were subjected to OT for hematoma evacuations and drain placement. After the procedure the patients were admitted to the ward for 48 hours and the drain was removed after 48 hours. Then the patients were discharged and follow-up was taken one month for diagnosis of recurrence. Recurrence was labeled positive if a hematoma's postoperative symptoms persist and necessitate any kind of reoperation within one month of primary surgery. All of the demographic information, including name, age, gender, and duration of CSDH, was entered into a pre-made proforma.

Statistical Analysis

The data on proforma was analyzed in SPSS software version 22. Numerical variables i.e., age, and duration of CSDH were stated in terms of means $\pm$ standard deviation while categorical variables like gender and recurrence were expressed in terms of frequencies and percentages. Recurrence was stratified by age, gender, and CSDH duration to determine effect modifiers. Following stratification, a chi-square test was performed, and a P value of ≤ 0.05 was considered significant.

RESULTS

Age and Gender Distribution

Nine patients (11%) and 76 patients (89%) were between the ages of 18 and 40. and, 41 and 60, respectively, according to our examination of the age distribution of 85 patients. The average age was 51 years, with a standard deviation of ± 7.55 . A review of the 85 patients' gender distribution showed that 60 (or 71%) were men and 25 (or 29%) were women. The mean age was 51 with

a standard deviation ± 7.55 .

Duration of Chronic Subdural Hematoma

Among 85 patients was analyzed as 77(91%) patients had subdural hematoma ≤ 3 months while 8(9%) patients had subdural hematoma > 3 months (Figure 1). The mean duration of CSDH was 2 months with SD ± 1.91 .

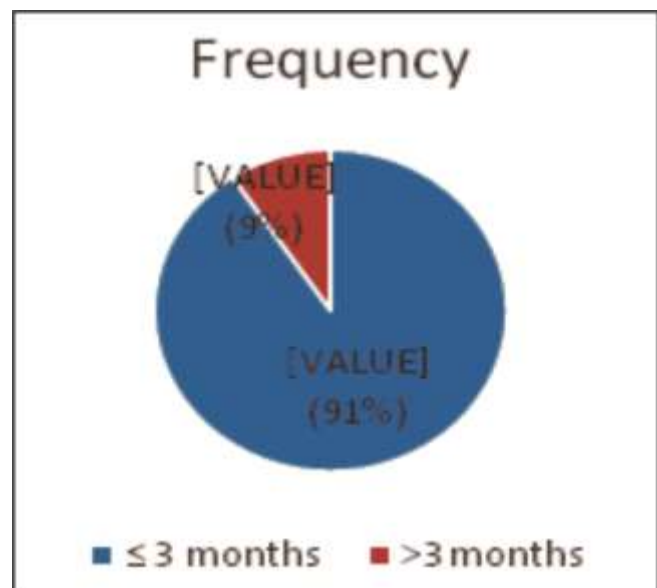


Figure 1: Duration of CSDH (N=85).

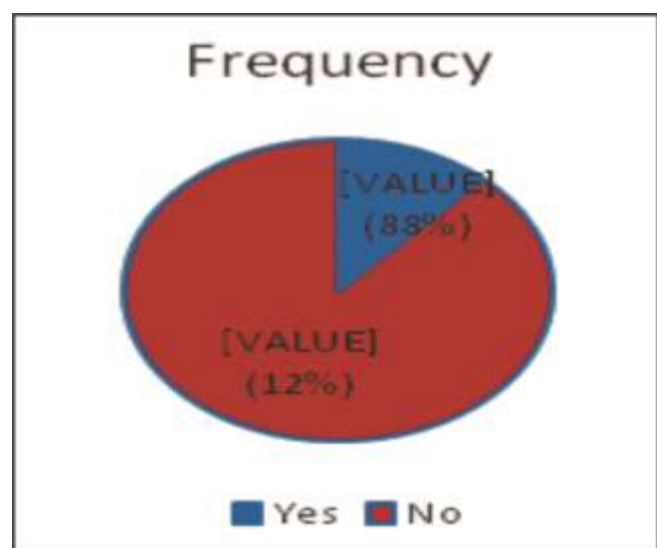


Figure 2: Recurrence Stratification Frequency Based on Age.

Status of Recurrence: was analyzed as 10(12%) patients had recurrence while 75(88%) patients didn't have recurrence (Figure 2). Tables 1-3 show stratifications of recurrence by age, gender, and duration of CSDH.

Table 1: Recurrence Stratification Based on Age(N=85).

Recurrence	18-40 Years	41-60 Years	Total	P value
Yes	1(11%)	9(12%)	10(12%)	0.949
No	8(89%)	67(88%)	75(88%)	
Total	9(100%)	76(100%)	85(100%)	

Table 2: Recurrence Stratification Regarding Gender Distribution (N=85).

Recurrence	Male	Female	Total	P value
Yes	7(12%)	3(12%)	10(12%)	0.965
No	53(88%)	22(88%)	75(88%)	
Total	60(100%)	25(100%)	85(100%)	

Table 3: Recurrence Stratification According to CSDH Duration (N=85).

Recurrence	≤ 3 Months	>3 Months	Total	P value
Yes	8(10%)	2(25%)	10(12%)	0.222
No	69(90%)	6(75%)	75(88%)	
Total	77(100%)	8(100%)	85(100%)	

DISCUSSION

Our analysis showed that among 85 patients mean age was 51 years with SD $\pm$ 7.55. 60(71%) patients were males and 25(29%) patients were females. 77(91%) patients had subdural hematoma $\leq$ 3 months while 8(9%) patients had subdural hematoma >3 months. 10(12%) patients had recurrence while 75(88%) patients didn't had recurrence.

A similar finding was witnessed in another study conducted by Greuter L et al.¹¹ There was a significant difference seen between SPD and SDD insertion in the recurrence rate of CSDH (11.9 and 12.3%). Furthermore, SPD exhibited noticeably

reduced rates of morbidity (6.4 and 8.2%), parenchymal injury (1.2 and 7.8%; RR 0.17), and drain misplacement. Both groups had similar expected clinical outcomes (89.6 and 88.9%; RR 1.1) and death rates (5.0 and 4.6%; RR 0.83).

Another study by Stanišić et al. produced similar findings,¹² which discovered that the best predictors of RrR were post-operative CSDH cavity volume of more than 200 mL, laminar or separated lesions, and isodense or hyperdense lesions. The intermediate predictors of RrR were a preoperative CSDH volume greater than 130 mL and a postoperative CSDH cavity capacity of 80 to 200 mL. The predictive CSDH grading system showed that none of the patients with a zero score had RrR. Patients having scores of one to two points exhibited 6% of RrR, 30% of patients scoring three to four points, and 63% of patients scoring five points or higher (i.e., the maximum score). The rate of RrR increased steadily as the predictive CSDH grading score increased (P<.001). Three months after the CSDH was evacuated using a single burrhole and drainage, the rate of return was 16% (17/107 patients); However, this number included both unilateral and bilateral cases, and it wasn't stated where the used drain was located.

Analogous results were noted in an additional investigation conducted by Tailor et al.¹³ During surgery, subdural drains were inserted in 31% of patients. Placing the drain was linked to fewer reoperations (8% vs. 17%, p = 0.021) without raising the rates of complications. After the Santarius et al, (2009) experiment was published, the amount of drain utilization increased; yet, we saw persistent and noteworthy diversity in the amount of drain used by supervisory consultants. Following the release of these findings, the department's usage of drains rose from 35% to 75% of all cases.

Similar results were seen in a different study conducted by Yadav et al,¹⁴ which discovered that the patients' ages ranged from 18 to 75 years old, with a mean age of 57 years. In GCS categories 3–

8, 9–12, and 13–15, there were 9, 47, and 204 cases, respectively. Regarding age, etiology, gender, and neurological condition, the two groups were similar. The mortality rates for the two groups were the same. When compared to the group without a drain, the suction drain group experienced considerably fewer recurrences and cases of postoperative pneumocephalus. No infection or other suction drainage-related complications were present. Following the subgaleal closed-system drainage of low-negative pressure and one burr hole (16 mm in diameter) for CSDH evacuation, the RR was 3.57% (5/140 patients).

Similar results were noted in a different study conducted by Chih et al.¹⁵ Overall, neither group's pre-operative or post-operative symptoms, Markwalder grades, post-operative hematoma volume and recurrence, mortality, or functional outcome at discharge or the three-month follow-up showed a statistically significant difference. Even though it did not reach statistical significance, we saw a decrease in surgical complications after the SPD system was implanted, particularly for post-operative cerebral hematomas. Following the evacuation of CSDH, reoperation rates were found to be 3.3% in the subdural group and 6.7% in the subperiosteal group between subperiosteal and subdural drains. They used no suction force and only drilled one tiny burr-hole (about 10 mm in diameter).

In another study conducted by Zhang et al.¹⁶ in which out of the 570 patients that were examined, 241 (42.3%) and 329 (57.7%) had subperiosteal drains placed. CSDH recurrence (13.1% in the subdural group vs. 11.2% in the subperiosteal group; $P = 0.502$) and 6-month mRS score (27.2% with mRS 4–6 in the subdural group vs. 20.4% in the subperiosteal group; $P = 0.188$) did not significantly differ between the 2 drain groups.

In another study conducted by Molina et al.¹⁷ For analysis purposes, a total of 148 patients were found. Among the sample, 50.7% ($n = 75$) had an age over 76. Among all patients, 23.6% ($n = 35$) had hematoma recurrences that needed surgery.

Significantly more common in the recurrence group were preoperative thrombocytopenia, postoperative midline shift >6 mm, hematoma volume >80 mL, and total hematoma density >45 Hounsfield Units (HU). Postoperative hematoma density and volume were also identifiable risk indicators following multivariate analysis and were incorporated into the risk assessment method. Based on their total score, the patients were split into three risk groups.

CONCLUSION

Our study concludes that the recurrence rate of chronic subdural hematoma (CSDH) was 12% after using subdural drain in patients with chronic subdural hematoma.

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Additional Information

Disclosures: Authors report no conflict of interest.

Ethical Review Board Approval: The study conformed to the ethical review board requirements.

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

Conflicts of Interest:

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 or within the previous three years 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.

Financial Relationships: None.

Funding: No financial support has been taken from any funding agency or organization.

Data Availability Statement: The data record could be available to the request of corresponding author.

AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Hameed Ullah & Atta Ullah	1. Study design and methodology.
2.	Atta Ullah	2. Paper writing.
3.	Hameed Ullah & Atta Ullah	3. Data collection and calculations.
4.	Waseef Ullah & Junaid Alam	4. Analysis of data and interpretation of results.
5.	Amer Zaman, Bilal Ahmad	5. Literature review and referencing.
6.	Amer Zaman	6. Editing and quality insurer.