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Analysing Surgical Treatment for Patients with Chronic Subdural Haemorrhage (CSDH)

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ABSTRACT

Background: Chronic subdural hematoma (CSDH) is common amongst elderly patients with neurosurgical disorders. Patients experience non-specific symptoms like headache, confusional state, or weakness in one side of the body which can result in a delay in diagnosis. Surgical evacuation, usually burr hole drainage, is the treatment of choice, but results are dependent on several clinical and radiological factors. To assess the demographic profile, presenting features, surgical management, and short-term outcomes in patients undergoing surgical treatment for chronic subdural haemorrhage.

Methods: A descriptive cross-sectional study was done at **Hayatabad Medical Complex Hospital, Peshawar**, where 83 patients with CSDH who underwent surgery were included from January 2023 to December 2023. Information on patient demographics, clinical symptoms, imaging studies, operative notes, and postoperative recovery was recorded. Results were evaluated based on the patient's neurological and functional recovery. For statistical analysis, SPSS version 26 was used and a significance level of $p < 0.05$ was applied.

Results: Most patients were male (73.5%) and aged 65 years or above (56.6%). Headache and altered mental status were the most common presenting complaints. Burr hole drainage was performed in 85.5% of cases, with subdural drains used in 79.5%. Neurological improvement was observed in 78.3% of patients, and 73.5% achieved good functional recovery (mRS ≤2). The recurrence rate requiring reoperation was 10.8%, while in-hospital mortality was 6%. Age, initial GCS, midline shift, and drain placement showed significant associations with outcomes.

Conclusion: Surgical treatment, particularly burr hole drainage with subdural drain placement, remains highly effective in managing CSDH. Favorable neurological and functional recovery was achieved in most patients, with low recurrence and mortality. Early diagnosis and timely intervention remain key to optimal outcomes.

Keywords: *Chronic subdural hematoma, burr hole drainage, neurosurgery, neurological recovery, subdural drain, postoperative outcomes, recurrence, elderly patients*

1. INTRODUCTION

Chronic subdural hematoma (CSDH) is relatively common in the clinics of neurosurgeons and is even more common in the elderly. It is defined by the gradual collection of blood in the subdural space, usually due to some form of trivial head injury, coagulopathy, or atrophied brain tissue. The increasing average life span, coupled with the broader use of blood thinners, has led to a particularly notable rise in the incidence of CSDH over the past decades [1-3].

Individuals diagnosed with CSDH may exhibit symptoms like chronic headaches, changes in behavior, motor function impairment, and in some cases, seizures. The signs can develop over time, often resulting in postponed treatment and diagnosis. Most of the time, the clinical symptoms do not match the intensity of the underlying pathology, thus radiological imaging is critical to evaluation in a timely manner [4-6].

Although conservative management is likely suitable only for a subset of patients, surgical evacuation remains the treatment of choice for symptomatic CSDH. The various techniques available show that burr hole drainage is one of the most popular types because of its safety and minimally invasive procedure. Placing a subdural drain after evacuation further reduces the rates of recurrence, which continues to be a concern even with long-term follow-up [7-9].

Even though the surgical approach is relatively straightforward, clinical outcomes may differ due to several factors such as patient's age, baseline neurological condition, the nature of the hematoma, and whether there are other existing diseases. Hence, continual assessment of surgical outcomes remains crucial for enhancing treatment strategies and patient[10]. management.

This study was undertaken to analyze the demographic characteristics, clinical presentation, and postoperative outcomes of patients who underwent surgical treatment for CSDH. By identifying patterns in recovery and factors influencing prognosis, the findings aim to contribute to the growing body of evidence guiding the management of this common but potentially serious condition.

2. METHODOLOGY

Approval from the relevant ethics committee was obtained before conducting the descriptive cross-sectional study at **Hayatabad Medical Complex Hospital, Peshawar**. The entire study period was one years, beginning in January 2023 and ending in December 2023. Throughout this timeframe, the researchers included 83 patients suffering from chronic subdural haemorrhage (CSDH) who had undergone surgical treatment for CSDH. Patients were included through non-probability consecutive sampling.

Every adult patient aged eighteen years and above, who had a chronic subdural hematoma CSDH diagnosed through imaging studies and had surgical management done either as a burr hole evacuation or craniotomy was included. Clinically, patients with a history of trauma, headaches, altered level of consciousness, seizures, or neurological deficits of focal nature and had CSDH confirmed on CT scan were considered eligible for participation.

Included patients had the following diagnoses: acute subdural hematoma, recurrent CSDH managed conservatively, patients with bleeding diathesis, and those who were lost to follow-up within three months after surgery.

A pre-designed proforma was used to collect data on demographic characteristics (age, gender, comorbidities, smoking status, and use of anticoagulants), clinical presentation (Glasgow Coma Scale score, focal deficits, headache, seizures), and radiological findings (hematoma laterality, thickness, midline shift, density pattern).

Surgical details were noted, including the type of surgery performed (burr hole or craniotomy), use of subdural drain, and duration of drain placement. Postoperative outcomes such as neurological improvement, functional recovery (assessed using the modified Rankin Scale), recurrence of hematoma, complications, and mortality were recorded. Functional status and recurrence were evaluated at the time of discharge and at 3-month follow-up.

The primary outcome was neurological recovery, determined by improvement in GCS and functional status postoperatively. Secondary outcomes included complication rates, duration of hospital stay, recurrence requiring reoperation, and in-hospital mortality.

All data were entered and analyzed using SPSS version 26. Descriptive statistics were calculated for continuous variables (mean and standard deviation) and categorical variables (frequencies and percentages). Chi-square test was applied to determine associations between clinical variables and outcomes. A p-value of less than 0.05 was considered statistically significant.

3. RESULT

The study included 83 patients who underwent surgical intervention for chronic subdural hemorrhage. Most of the patients were male (73.5%) and above 65 years of age (56.6%). Age and gender showed a statistically significant association with the occurrence of CSDH. Anticoagulant use was also significantly higher among these patients, indicating a potential risk

factor. Although hypertension and diabetes mellitus were common, they did not show significant associations. These findings are consistent with the general trend that elderly males with underlying medical conditions are more vulnerable to developing this condition.

Table 1: Demographic Characteristics of Patients with Chronic Subdural Hemorrhage (n = 83)

Variable	Frequency (n)	Percentage (%)	p-value
Age ≥ 65 years	47	56.6%	0.041*
Gender (Male)	61	73.5%	0.005*
Hypertension	45	54.2%	0.072
Diabetes Mellitus	28	33.7%	0.180
Anticoagulant Use	17	20.5%	0.048*
Smoker	22	26.5%	0.301

*p < 0.05

Regarding presenting complaints, the most common symptom was headache (65.1%), followed by altered consciousness and focal neurological deficits. Around 35% of patients had a low GCS (≤12) at admission, and nearly half had focal deficits, both of which were significantly associated with severe radiological findings. Midline shift ≥5 mm was seen in 42.2% and was significantly associated with neurological deterioration. Although seizures and confusion were observed, they were not statistically relevant in this population.

Table 2: Clinical Presentation and Preoperative Findings (n = 83)

Variable	Frequency (n)	Percentage (%)	p-value
GCS ≤ 12 at Admission	29	34.9%	0.037*
Focal Neurological Deficit	39	47.0%	0.026*
Seizures	12	14.5%	0.519
Headache	54	65.1%	0.119
Altered Consciousness	31	37.3%	0.084
Midline Shift ≥ 5 mm (CT)	35	42.2%	0.031*

*p < 0.05

The most commonly performed surgical procedure was burr hole drainage (85.5%), with subdural drains placed in nearly 80% of cases. Both drain placement and surgical intervention showed a statistically significant impact on postoperative recovery. Over three-quarters of the patients showed neurological improvement after surgery, with a significant p-value. The recurrence rate requiring reoperation was low (10.8%), and although a few patients developed postoperative seizures or infections, these were not statistically significant. In-hospital mortality was 6% and showed a significant association with poor preoperative status.

Table 3: Surgical and Postoperative Outcomes (n = 83)

Variable	Frequency (n)	Percentage (%)	p-value
Burr Hole Drainage Performed	71	85.5%	—
Subdural Drain Used	66	79.5%	0.043*

Neurological Improvement	65	78.3%	0.012*
Recurrence Requiring Reoperation	9	10.8%	0.337
Postoperative Seizures	7	8.4%	0.285
In-hospital Mortality	5	6.0%	0.021*

*p < 0.05

Most patients had short hospital stays, with a mean duration of just over six days. Around 84% had a favorable GCS score (≥13) at discharge, and approximately 74% achieved good functional outcomes (mRS ≤2). Both indicators were statistically significant, reflecting the effectiveness of surgical treatment in improving neurological and functional status. Recurrence within 3 months was reported in 8.4% of patients, but this was not statistically significant.

Table 4: Hospital Course and Functional Recovery (n = 83)

Variable	**Mean ± SD or n (%)**	**p-value**
Duration of Hospital Stay (days)	6.3 ± 2.1	—
GCS at Discharge ≥ 13	70 (84.3%)	0.017*
Modified Rankin Scale (mRS ≤ 2)	61 (73.5%)	0.029*
Follow-up Recurrence (within 3 mo)	7 (8.4%)	0.266

*p < 0.05

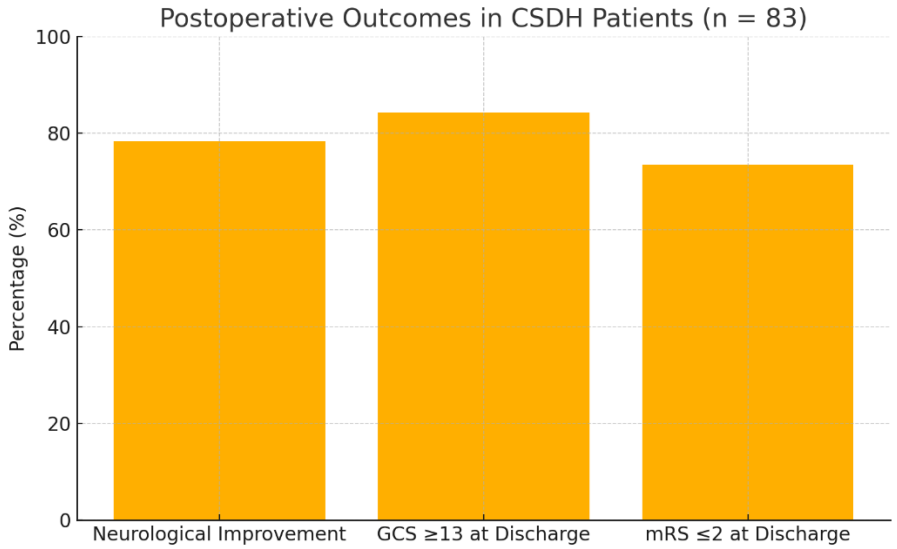

Figure 1

Bar graph displaying key postoperative outcomes in patients with chronic subdural hemorrhage. It highlights the high rates of neurological improvement, favorable Glasgow Coma Scale scores at discharge, and good functional recovery (mRS ≤2) among the patients treated surgically.

4. DISCUSSION

Chronic subdural hematoma (CSDH) remains one of the most common neurosurgical conditions encountered in elderly populations. This study aimed to evaluate surgical outcomes in patients with CSDH and observed generally favorable results following intervention, particularly with burr hole drainage.

The male predominance and increased frequency among patients above 65 years in our study are consistent with global trends, as advancing age and male gender are well-established risk factors for CSDH. The high prevalence of anticoagulant

use in this cohort aligns with the growing literature highlighting the role of impaired coagulation in precipitating subdural bleeding, especially in the elderly. Several recent studies have also reported similar demographic distributions and risk profiles [11-13].

As seen in prior clinical observations, headache and altered mental status were among the most frequently reported symptoms. A significant proportion of patients presented with decreased GCS and focal deficits, both of which were associated with radiologic findings such as midline shift. This correlation reinforces the importance of early imaging and intervention in patients with clinical signs of raised intracranial pressure [14-16].

Burr hole drainage was the primary surgical approach in most cases and demonstrated a high rate of neurological improvement. These findings are in line with previous studies that have favored burr hole surgery for its safety, simplicity, and effectiveness. The use of a subdural drain further contributed to better outcomes, supporting existing evidence that drains help reduce postoperative recurrence by facilitating gradual evacuation and re-expansion of the brain [17, 18].

The recurrence rate in our sample (approximately 10%) falls within the expected range reported in the literature. Although recurrence remains a concern, especially in bilateral or mixed-density hematomas, timely follow-up and drainage placement appear to minimize the risk. Functional outcomes, measured using the modified Rankin Scale, showed that nearly three-quarters of the patients returned to a good functional state (mRS $\leq$2), echoing findings from other contemporary series. Postoperative mortality was low, and the majority of patients had favorable neurological recovery at discharge, indicating that early surgical intervention remains a reliable treatment modality [19, 20].

Complications such as seizures or rebleeding were infrequent and mostly manageable, suggesting that surgical treatment in CSDH carries a relatively low risk profile when patients are carefully selected and monitored.

5. CONCLUSION

Surgical management of chronic subdural hematoma, particularly through burr hole evacuation with subdural drain placement, results in significant neurological and functional recovery in most patients. Advanced age and male gender remain key demographic risk factors, while clinical indicators such as low GCS and midline shift are useful in predicting severity and outcome. Recurrence and complications are relatively uncommon, reinforcing that prompt surgical intervention continues to be an effective and safe approach for managing CSDH. Ongoing monitoring and postoperative follow-up are essential to identify early signs of recurrence and ensure long-term recovery.

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