

Original Article**A Clinical Study on Chronic Subdural Hematoma and its Surgical Management at a Tertiary Care Hospital in the Eastern Part of Nepal****Sunil Singh, Prakash Kafle, Narendera Prashad Joshi, Aakash Kafle, Tejendra Karki**

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Article Received: 24th May, 2025; Accepted: 25th July, 2025; Published: 31st July, 2025**DOI: <https://doi.org/10.3126/jonmc.v14i1.83343>****Abstract****Background**

Chronic subdural hematoma is a common neurosurgical condition, particularly in elderly patients, often associated with minor head trauma and requiring surgical intervention. This study aims to analyse the demographic patterns, clinical presentation, management, complications, and outcomes.

Materials and Methods

A retrospective study was conducted on 51 patients who underwent surgical treatment for chronic subdural hematoma. Demographic details, clinical presentation, history of trauma, associated comorbidities, radiological findings, surgical techniques, intraoperative findings, complications, and outcomes were collected and analyzed.


Results

In the present study, a total of 51 cases were analyzed for the study. There was male predominance (82.35%) in the study with male-to-female ratio of 5:1. The age of study population ranged from 25 to 88 years, with a median of 54 years (± 16.52 SD). Headache was the most common symptom (51%). A history of head trauma within eight weeks was reported in 94.1% of cases. The most common comorbidities were diabetes mellitus (23%). Radiological assessment revealed right-sided hematomas in 56.9% of cases, with 41.2% exhibiting a midline shift greater than 10 mm. Single burr hole drainage was the most performed procedure (78.4%), followed by two burr hole drainage (13.7%), mini craniotomy (5.9%), and decompressive hemicraniectomy (2%). The overall complication rate was low, with recurrence occurring in 3.9% of cases. The functional outcomes were favourable, with 92.2% achieving good recovery at discharge.

Conclusion

Chronic subdural hematoma predominantly affects elderly males and is strongly associated with prior head trauma. Burr hole drainage remains the preferred surgical technique.

Keywords: *Subdural, Hematoma, Brain Injury, Coma, Complication*

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Introduction

The Chronic Subdural Hematoma (CSDH) is an encapsulated crescentic collection of fluid, blood, and blood degradation products layered between the dura and arachnoid covering the brain surface which is localized between the dural border cell layer occurring 3 weeks or 21 days after a mild to moderate traumatic brain injury episode [1, 2]. Chronic subdural hematoma (CSDH) and subacute subdural hematoma (SASDH) are the two most common neurosurgical diseases; the incidence of these diseases has been increasing, partly due to an increase in the elderly population and the use of oral antiplatelet and anticoagulation agents [3–5]. Fragile neo-vessels in the membranes that cover the CSDH and an imbalance between activated coagulation and fibrinolysis have been discussed as possible causes of multiple re-bleeding events and chronic nature of the subdural hematoma especially in young people [6]. Chronic subdural hematoma (CSDH) represents one of the most frequent types of intracranial hemorrhage with a favorable prognosis when treated adequately. The annual reported incidence of CSDH is approximately 0.001–0.002% [5]

Patients often live with these two conditions in the community and do not seek medical attention until they become symptomatic [5, 7]. The most used surgical approaches include: twist-drill craniostomy, one or two burr holes craniectomy, and craniotomy [8, 9].

In our service, burr-hole craniotomy with closed-system drainage has been the operative technique of choice for 10 years. The purpose of this article is to present our experience of the surgical management of 1000 patients with CSDH using a burr-hole and a closed drainage system [10]

Nobel Medical College & Teaching Hospital, Biratnagar is a high-volume center at Eastern Part of Nepal, where 24-hour Neurosurgery Service is available.

Materials and Methods

This is a retrospective study conducted at Nobel Medical College and Teaching Hospital, Biratnagar- Nepal over the period 18 months from August 2023 to December 2024. Ethical clearance was obtained from the Institutional Review Committee (IRC) of Nobel Medical College and Teaching Hospital, Biratnagar. During this period, a total of 62 patients with chronic subdural hematoma (cSDH) underwent surgical intervention. Among them, 6 patients had incomplete or inadequate documentation and were therefore excluded from the study. As a

result, a total of 56 patients (all eligible cases) were included in the final analysis.

Inclusion Criteria

1. Age above 18 years
2. All radiologically (CT/MRI) confirmed cases of chronic and mixed density SDH (chronic component mixed with sub-acute or acute component).

Exclusion Criteria

1. Patient expired before surgical intervention
2. Patients with other radiological finding such as tumor or Cerebro-vascular accident
3. Patients in whom cerebrospinal fluid (CSF) diversion procedure was done and
4. Patients with history of previous cranial surgery for other cause

Demographic parameters such as age, sex, history of trauma, alcohol abuse, drug usage or abuse, and clinical signs and symptoms were recorded. The preoperative neurological assessment and GCS score were recorded. Plain CT scan of head was used for diagnosis of CSDH. Magnetic resonance imaging (MRI) of brain was advised where hematoma margin was blurred due to sub-acute component. The side, type of CSDH, mass effect/midline shift etc were recorded. All the surgical procedures were performed by experienced neurosurgeon in the department of Neuro-surgery. Operative procedure for each case were decided according to the standard neurosurgical protocol based on radiological findings and patient condition. Two burr hole of size approx. 15 mm to 20 mm, one in fronto-temporal junctional region anteriorly preferably underneath the temporalis muscle and one in posterior parietal region was used for hemispheric CSDHs/CSDHs involving more than one region. Bilateral SDHs were treated in one setting. After evacuation of SDH, the space was filled with normal saline. Craniotomy was used for recurrent cSDH, cSDH with multiple loculations and CSDH with large, organized clot. After craniotomy, all the loculations and most of the outer and inner membrane were resected. subdural cavity was filled with normal saline. Local anesthesia was used for unstable patients (patients who were on inotropic support or having multiple co-morbidities like coronary artery disease (CAD), chronic kidney disease (CKD) where general anesthesia is contraindicated or in cases who are gasping or low GCS where immediate surgery was needed. In rest of the cases, general anaesthesia was used as it makes the whole process of surgery smooth with lower risk of intraoperative complications due to sudden movement of head while doing surgery



inconscious/semiconscious/irritable patients. Intra-operative findings were recorded. subdural drain was placed after evacuation of hematoma. When it was indicated the closed drainage system was connected to a soft collection bag that was kept in dependent position and the patient was kept in supine position for 48 to 72 hours. The drain was removed after doing a CT scan of brain after 48 - 72 hours of the surgical intervention. During post-operative period, patient was assessed for neurological improvement and complications. After discharge from hospital, patients were followed up at 6 weeks and 3 months for assessment of their clinical status at (OPD and/or telephonically). During follow up, patients and their relatives were asked about their activity of daily living and morbidity status. Outcome was assessed according to the Glasgow Outcome Scale (GOS) at the time of discharge and follow upto 3 months from the hospital. Peri-operative mortality was defined as mortality within 30 days after surgery. Data were presented in terms of median \pm SD and percentages. Diagrams and charts were added wherever necessary. Statistical analysis was done using Microsoft Excel 2010, SPSS version 20.

Results

During the study period, a total of 56 cases of cSDH were managed at our institute. Two cases had thin chronic subdural hematoma with mild headache. They were managed Conservatively with steroids and statins. Three cases were lost on follow up so these total five cases were not included in the analysis. The analysis result of individual parameters is as mentioned below. In our study total of 51 patient were operated among them, 42 (82.35%) were male and 9 (17.65%) were female with male to female ratio of 5:1. The age ranges from 25- 88 years and mode was 54 years with standard deviation of ± 16.52 years. This is as shown in table 1.

Table-1: Sex Distribution of the study Population

Sex Distribution			
Sex		Frequency(n)	Percentage (%)
Male		42	82.4
Female		9	17.6
Total		51	100

In this study the most common presenting symptom was headache followed by loss of Consciousness and Seizure which comprise of

51%(n=26), 39.2%(n=20), and 9.8%(n=5) respectively. All most all patient 94.1%(n=48) gives history of some form of head trauma within 8 weeks period of presentation. Only 5.9%(n=3) were not aware of head injury.

Of the study population 58.8%(n=30) had some form of comorbidities and the remaining 41.2 % did not have any form of comorbidities. The most common associated commodities being Diabetes (23%, n=12), Hypertension (21%, n=21), . Other associated commodities were Coagulopathy and liver Disease

Overall, 37.3%(n=19), had presenting GCS 8 or less than 8 and 52.9%(n=27) had GCS between 9-12. and remaining had GCS 13-15. There was no obvious clinical deficit in 41.2%(n=21) at the time of presentation.

Most of the cSDH were localized on the right side (56.9%, n=29) followed by equal distribution in left side and bilaterality , 11%(n=21.6). Highest no of patients , 41.2%(n=21) had midline shift of > 10 mm and in 39.2 % (n=20) the midline Shift was between 5-10 mm. Remaining 19.6%(n=10) had midline shift < than 5 mm.

The types of Internal architecture of cSDH as seen on CT head was seen as tabulated below in table no.2

Table 2: Radiology of the CSDH

Internal Architecture of cSDH on CT			
Radio-logical types of CSDH based on Morphology		Frequency	Percent
	Homogeneous	43	84.3
	Trabeculation	3	5.9
	Septation	3	5.9
	Laminar	2	3.9
Total		51	100.0

Most of the patients who had undergone surgery had undergone single burr hole (78.4%, n=40), (13.7%(n=7) Double Burr hole, 3 patient (5.9%) Mini craniotomy and one patient (2%) had to undergo decompressive hemicraniectomy (DHC). Preoperatively 56.9%(n=29), had motor oil colored fluid on draining cSDH. Only 3.9% (n=2) had organized clots. On of them had to go for decompressive hemicraniectomy and other one was managed with Mini craniotomy. All most all cases had post operative silicon drainage tube placed (94.1%(n=48) in the subdural space after the hematoma evacuation. In the present study, the most common complications observed was recurrence which was seen in 3.9% (n=2) other complications observed were as tabulated below in table no 3.



Table 3: Complications in the present study

SN	Complications	Frequency(n)	Percentage %
1.	Recurrence	2	3.9
2.	Seizure	1	2.0
3.	Surgical Site Infection	1	2.0
4.	Empyema	1	2.0
5.	ClinicallySignificant Pneumocephalus	1	2.0

Majority of the patients 92.2% (n=47) had good recovery at time of discharge whereas at 6 weeks follow up 96.1% (n=49) had good recovery and at 3 months follow up 100% (n=51) had good recovery. The detail is as shown in the table no.4 below.

Table 4: Glasgow outcome Scale (GOS)

GOS	At Discharge	At 6 Weeks	At 3 months
Death	0	0	0
Vegetative state	0	0	0
Severe disability	2	0	0
Moderate disability	2	2	0
Good recovery	47	49	51

Discussion

In our study more than 80 % of the patient of CSDH was male. The study done by Ahmed S reports the same sex predominates in their study where they reported that the male population consist of more than 50% [6, 10–12]. Reason for higher number of males could be due to the fact that-males are more exposed to trauma and alcohol abuse/ dependency [10]. Male to female ratio was 5:1. This trend is very similar to the other noted studies [10,11] Male: Female ratio of 3:1, this trend is very similar to the other noted studies. Common presentation of this disease's entity ranges from a simple refractory headache to other serious neurological symptoms [12].

Most of the patient presents with more than one symptom, we found headache as the most common clinical presenting symptom (51%). Kurmi et al found headache as the most common clinical presenting symptom (65.38%) [13].

Loss of consciousness is also found in many patients with CSDH. Patient may present with confusion, varying degree of drowsiness or unconsciousness. Sometimes, patient may present with acute delirium which is very difficult to differentiate from other behavioral or psychiatric disease, in our study we found Loss of consciousness as the second most common symptom (39.2%). In other study, we found altered

sensorium as the also second most common symptom (38.46%)[13].

Hemiparesis is a common presentation in the unilateral CSDH which is comparatively less commonly found in the bilateral CSDH [14]. Neurological deficits are most seen on the contralateral side. Direct pressure on the cerebral hemisphere is thought to be the underlying mechanism. We have also found hemiparesis as one of the important symptoms. Bilateral lesions may sometimes present with paraparesis or quadriparesis present in 30 patient (58.8%) in other study we have found focal deficit in (26.92%) of patient [15].

History of generalized seizure (9.8%) is one of the striking features in our study which was found in lower in frequency in other previous studies by Ramachandran et al, Sousa et al., Mori et al., and krupp et al. [11,16–18]. Seizure usually occurs in the presence of a large hematoma associated with focal neurological deficit.

Other symptom found in CSDH are intermittent vomiting, brief loss of consciousness, gait disturbance [6], memory disturbances, personality or intellectual changes [19], emotional outbursts, altered behavior [11,16]

Lack of concentration, sleep disturbances, speech problems, maniacal and depressive states [10,12]. These Symptoms were not analyzed in detail in our study.

An important risk factor for development of CSDH is trauma to the head. 94.3 % of patient have history of trauma over the head. In the study by kumari et al head trauma history was found in only 56-79% [13]. Elderly patients are more prone to falls and that's the cause that we get history of falls more commonly in this group of patients. The duration between the history of trauma and presentation is typical which vary from weeks to months [20]. In our study, maximum patient has resent history of trauma. Majority had history of minor trauma from one to six weeks prior to presentation.

Increased incidence of CSDH is seen in chronic alcoholic patients (28,29). Although exact mechanisms are not known precisely, but the propensity of alcohol dependent individuals to experience trauma is much higher than the normal individuals [12].

As CSDH affects the elderly people, many other diseases of old age are also frequently encountered. Most common diseases found are hypertension, diabetes mellitus, coagulopathy and liver disease. Simultaneous good management of these disease helps to decrease morbidity and



mortality. We found hypertension in 21 (42.2%) of our patient. We found diabetes mellitus in 12(23.5%) of our patient. Huang YH , Yang KY, Lee TC, et al reported that hypertension in 14% to 52% of cases. Diabetes mellitus may also be found in more than 20% of patients [14]. Patient with coagulopathy often under antiplatelet and other anticoagulant medication and many a times we require to correct coagulation profile before undertaking surgical management. Coagulopathy and chronic antiplatelet Intake are also associated with increased risk for development of CSDH [18].

In our study 17 (33.33%) patient presented with GCS:9/15, 10 (19.60%) patients presented with GCS:12/15, 13 (25.49%) patients presented with GCS:7/15, 6 (11.76%) patients presented with GCS of 8/15 and 5(9.8%) patients presented with GCS of 14/15 respectively. In the study by Rauhala et al, most patients with cSDH present with a GCS between 13-15 with an estimate that only about 8% present with a GCS between 9 and 12, and 3% with a GCS between 3 and 8 [21]. Unilateral CSDH are more common than bilateral. Almost all previous studies showed slightly increased incidence on right side [6,11,16,22,23]. In our study, the most common side of hematoma presentation was towards the right side 29 (56.9%) followed by left side 11 (21.6%) and bilateral hematoma was 11 (21.6%). Patient with bilateral CSDH may develop sudden progression of symptoms and deterioration and therefore operative intervention should be undertaken as early as possible. Ahmed et al also reported in their study that unilateral CSDH is more common than bilateral. Almost all previous studies showed slightly increased incidence on right side (36.54%), followed by left (34.62%). Bilateral hematoma was detected in 28.85% [6]. In our study, the most common intraoperative findings were motor oil color fluid in 29 (56.9%) followed by maroon colored fluid in 14 (27.5%), Liquefied blood with clots in 6 (11.76%) and Organized clots in 2(3.9%) respectively. There is no literature found with my limited search describing these findings. All patients underwent surgical intervention. Single burr hole with closed drainage was done in 40 (78.4%) cases. Double burr hole was done in 7(13.7%), Mini craniotomy was done in 3(5.9%) and decompressive hemicraniectomy was done in 1 (1.96%) case. Burr hole procedure is one of the safest procedures. More than 90% patients with CSDH underwent burr hole procedure and rest underwent Mini craniotomy and Decompressive

hemicraniectomy in all most all previous studies. Sousa EB, Brandao LFS, Tavares CB, et al reported that Burr hole with closed drainage was done in more than 90 % cases and rest underwent craniotomy in almost all previous studies [16]. In most of the previous studies, subdural drain placement for 48 to 72 hours was done following burr hole procedure. Placement of subdural drainage reduces the risk of recurrence which was observed in our study also.

In our study, the complications were uncommon, recovery in more than 88% patients uneventful. The most common complications we encountered were recurrence 2 patient (3.9%), seizure 1 patient (1.96%), surgical site infection 2 patient (3.9%), empyema 2 patient (3.9%) and significant pneumocephalus 2 patient (3.9%). The elderly patient was more prone for electrolyte imbalance which is correctable. Two patients presented with symptomatic recurrent subdural collection where craniotomy was performed. Thus, the recurrence rate in our study was of 3.9%. Recurrence following burr hole is one of the common complications. It varies from 2% to 21% [6,11]. Shameem et al. had similar experience [6]. All these complications were comparable to our study; however, we have lowest recurrence rate which may be due to regular use of subdural drain. In other study Ducruet AF, Grobelny BT, Zacharia BE, et al reported that there is significant problem with CSDH surgery was recurrence, and it was estimated that 8% to 33% of all patients needed reoperation [24]. Recurrence risk factors often included older age, male sex, brain atrophy, use of anticoagulant or antiplatelet drugs, and the presence of a mixed or high-density hematoma on CT [22]. similarly, Rohde et al reported that subdural empyema occurred in 2.1% of post-operative patients who were given pre-operative antibiotics. currently, there are no prospective controlled studies comparing the incidence of post-operative infections with and without antibiotic use in the treatment of SDHs[25].

During the discharge, 96.07% (n=49) had favorable GOS.(2 patient (3.9%) had severe disability, 2 patient (3.9%) had moderate disability and 47 patient had Good recovery respectively). 3 and 6 months follow up all patients had favorable GOS.(2 patient (3.9%) were moderate disability and 49 (96.1%) patient had good recovery respectively.) Those 2 patients who had severe disability at the time of discharge improved over time and had moderate disability



at follow up in 3 months.

Conclusion

Our findings suggest that Chronic Subdural Hematoma primarily affects elderly males and is often associated with a history of minor head trauma. Single burr hole drainage with postoperative drainage placement remains a highly effective and preferred surgical approach, minimizing recurrence and complications.

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Conflict of interest: None

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