

Original Research Article

# The role of subgaleal suction drain in chronic subdural hematoma evacuation - Retrospective study in a tertiary care centre

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## Abstract

**Background:** Chronic subdural hematoma (CSDH) is one of the common problems seen in neurosurgical practice, especially in the elderly. Chronic subdural hematoma is a pseudo-encapsulated collection of old blood between the duramater and subarachnoid caused by tear of bridging veins.

**Materials and methods:** Total of 186 patients have underwent burr hole evacuation for subdural hematoma in the study period according to the medical records. Of which 93 had a subgaleal drain and rest 93 without the drain.

**Results:** The mean GCS at admission was 14 (+/- 1). Out of total 186 patients, 164 (88%) patients had unilateral CSDH and 22(12%) had bilateral CSDH. Among 164 patients with unilateral CSDH 82 (50%) and out of 22 with bilateral CSDH 11 (50%), subgaleal vacuum drain was placed. In rest of 82 (50%) patients with unilateral and 11 (50%) bilateral CSDH, drain was not used.

**Conclusions:** Chronic sub dural hematoma is a common presentation to the neurosurgeon. The present retrospective, comparative study of evacuation of chronic SDH with subgaleal suction drain, and without drain were compared and found to be an effective and safe method in reducing recurrence.

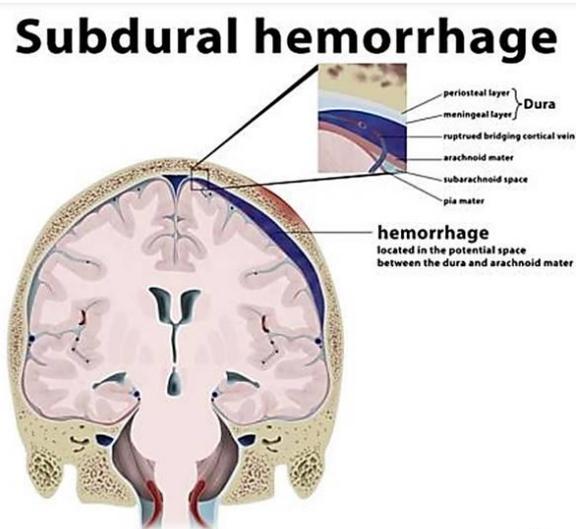
## Key words

Subgaleal suction drain, Chronic subdural hematoma, Evaluation.

## Introduction

Chronic subdural hematoma (CSDH) is one of the common problems seen in neurosurgical practice, especially in the elderly. Chronic subdural hematoma is a pseudo-encapsulated collection of old blood between the dura mater and subarachnoid caused by tear of bridging veins (Figure – 1). Repeated bleeding from external membrane capillaries facilitated by fibrin degradation products leads to its expansion [1]. Known risk factors for CSDH include coagulopathy, alcoholism, trauma and low intracranial pressures for example after lumbar drainage or ventricular peritoneal shunt. Patient commonly presents with headaches, confusion, drowsiness, vomiting, seizures, ataxia among other presentations and on examination, patient have various neurological deficits including a low Glasgow coma scale, ophthalmoplegia, hemiparesis/hemiplegia. Diagnosis is confirmed by non-contrast CT scan head as study of choice [2] even though in some cases MRI is also taken (Figures - 2, 3).

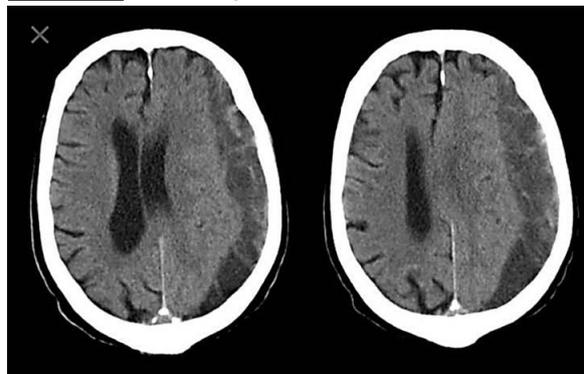
**Figure- 1:** Anatomical aspect of subdural hematoma.



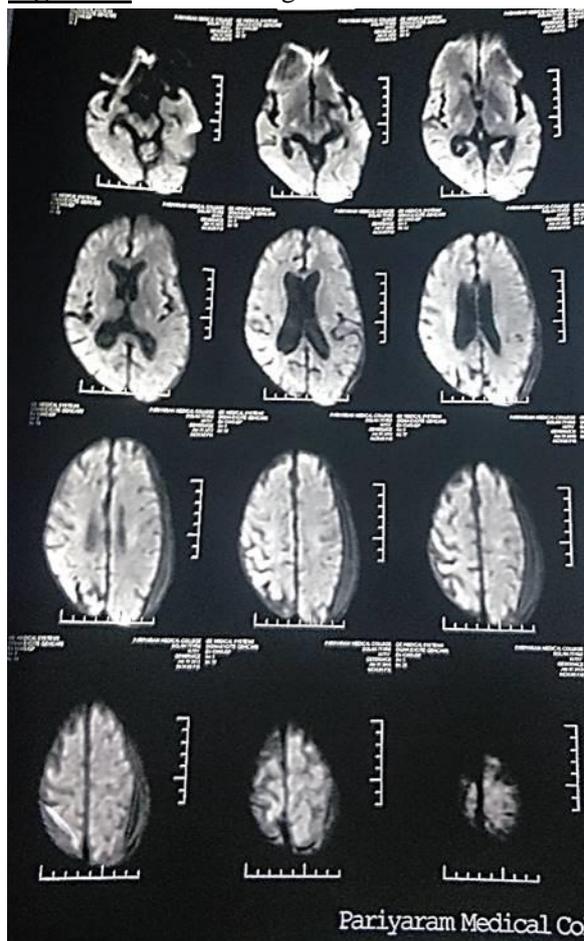
Surgical techniques are burr hole evacuation and craniotomy of which the former is more commonly done. Recurrence is one of the most common challenges in the treatment. Subgaleal drain is usually kept in which the tip of the drain is near the burr hole site subgaleally avoiding

direct contact of drain tip with brain matter (Figure – 4). There is controversy whether the use of drain decreases incidence of recurrence [2]. Limited information is available about the role of subgaleal suction drain in CSDH, hence this study.

**Figure- 2:** CT image of subdural hematoma.



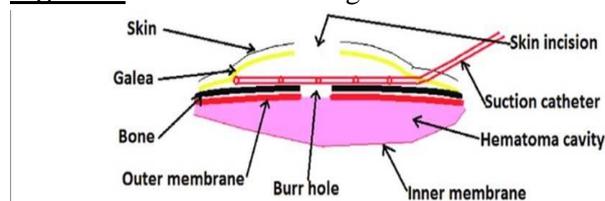
**Figure - 3:** MRI findings of subdural hematoma.



The aim of this study was to evaluate the level of safety and effectiveness of a subgaleal vacuum

drain in chronic subdural hematoma by evaluating the recurrence rate.

**Figure- 4:** Placement of subgaleal drain.



## Materials and methods

**Case study type:** Retrospective study

**Case subjects:** Patients who underwent burr hole evacuation surgery at Neurosurgery Department of Govt. Medical College, Kannur.

**Study period:** June 2014- June 2017

**Sample size:** 186

**Inclusion criteria:** All cases of CSDH treated in this hospital except those mentioned in exclusion criteria

**Exclusion criteria:**

- Recurrent CSDH
- CSDH secondary to coagulopathies
- Bilateral SDH
- Previous surgery
- CSDH in children below 18 years of age
- Secondary to tumor or due to intracranial hypotension
- Patients treated by craniotomy

### Method of study

Total of 186 patients have underwent burr hole evacuation for subdural hematoma in the study period according to the medical records. Of which 93 had a subgaleal drain and rest 93 without the drain.

### Surgical Procedure

Under strict aseptic conditions with patient under general anesthesia or local anesthesia with IV sedation, in supine position, with the head turned in the direction opposite to the side of collection of hematoma, burr hole craniectomy was performed. Following the drainage of the hematoma, subgaleal closed-system drainage of

low negative pressure was created and left in place. Romovac suction drain was used. The collecting bag capacity of 400 ml and the catheter size of 16 French gauges were used. To create a low negative pressure, the collecting chamber was depressed to about 25% of its height only. The scalp was closed in two layers.

All patients were kept in bed with 15-30° head end raised postoperatively. The drainage catheters were kept for 72 hours after surgery in all the cases. The patient received parenteral antibiotics for the first 3 postoperative days. Prophylactic anticonvulsants were also given during this period.

### Assessment

The postoperative case records were analyzed- Glasgow coma scale of the patient recorded postoperatively and reports of development of post-operative problems like recurrence, infection, symptomatic pneumocephalus were analyzed. Post-operative imaging (CT scan) reports were also studied.

### Statistical analysis

The results were calculated by statistical software SPSS. Mean was calculated for quantitative variables like age and GCS and categorical variables were presented by percentage.

## Results

There was a total of 186 patients included in the study, 128 men and 58 women in the study, ranging in age from 19 to 85 years (mean age, 63 ±15 years). The mean GCS at admission was 14 (+/- 1). Out of total 186 patients, 164 (88%) patients had unilateral CSDH and 22(12%) had bilateral CSDH. Among 164 patients with unilateral CSDH 82 (50%) and out of 22 with bilateral CSDH 11 (50%), subgaleal vacuum drain was placed. In rest of 82 (50%) patients with unilateral and 11 (50%) bilateral CSDH, drain was not used. The recurrence in either group was noted respectively. Among 93 patients with subgaleal drain only, 2(2.4%) out of

82 with unilateral CSDH and 1(9%) out of 11with bilateral CSDH had recurrence. Among 93 patients with no drain, 11(13%) out of 82 patients with unilateral and 4(36%) out of 11 patients with bilateral CSDH had recurrence. The overall postoperative recurrence was in 18(9.6%) out of 186 patients. The recurrence with subgaleal drain was in 3 patients (3.2%) out of 93 patients and without drain 15 (16%) out of 93 patients respectively. Also, the recurrence rate was high in bilateral CSDH as compared to the unilateral hematoma. Out of 164, 13(7.9%) patients with unilateral and 5 (22%) out of 22 patients with bilateral CSDH had recurrence. None of the patients had any signs of infection or symptomatic pneumocephalus.

## Discussion

In our study also subgaleal suction drain was also found to be an effective and safe method in reducing recurrence.

Considerable body of evidence supporting the use of external drainage after evacuation of primary CSDH exists in the most of the reported series [4-9]. Santarius, et al. [7], Ramachandran, et al. [10], Wakai, et al. [11], Tsutsumi, et al. [12], Gurelik, et al. [13] reported 9.3%, 4%, 5%, 3.1%, 10.5% recurrence rate in the drainage group as compared to 24%, 30%, 33%, 17%, and 19% respectively in the without drain group (**Table – 1**). Santarius, et al. [7] also reported lower 6 months mortality of 8.6% in the drain group as compared to 18.1% when drain was not used. On the other hand, there was no significant difference in the postoperative recurrence and the complications rates in the drainage group and the without drainage group in other studies [14, 15]. Advocates of no drain group argue that placing a drain could lead to complications such as brain injury, hemorrhage from neo-membranes, and infection without reducing recurrence.

**Table – 1:** Recurrences rates in the drain and without drain groups in chronic subdural hematomas.

Study	Recurrences with drain	Recurrences without drain
Ramchandran et al. 2007	4% (6/165)	30% (130/442)
Wakai et al. 1990	5%	33%
Santarius et al. 2009	9.3% (10/108)	24% (26/107)
Tsutsumi et al. 1997	3.2%	17%
Gurelik et al. 2007	10.5% (4/38)	19% (8/42)
Gazzeri et al. 2007	7.6% (17/224)	NA
Yu et al. 2009	6.6% (8/121). Recurrence was 16.3% (7/43) and 1.3% (1/78) in less than 3 days and 3 or more than 3 days drain, respectively	NA
Bellut et al. 2012	1.8 and 3.1% in subperiosteal and subdural drain, respectively	NA

Gazzeri, et al. placed tip of suction drain on burr hole which can assist in continuous evacuation of hematoma or collected air [3]. Placing suction tip away from burr hole site which could avoid accidental slippage of tip in subdural space.

Subgaleal drainage could avoid the risk of an acute hemorrhage from neo membrane injury which may occur during introduction and the removal of a subdural drain. It also reduces chances of brain parenchymal injury especially

after suction drain [16]. Acute subdural hematoma [17, 19] and intracerebral hematoma [18, 19] can develop into CSDH after subdural drainage. But none of these complications were encountered in our study.

The subgaleal drain reduced the chances of significant pneumocephalus in our study. The amount of subdural air is correlated negatively with the resolution of a CSDH [20]. It impedes the adhesion of the inner and outer membranes, prolonging the widening of the subdural space thus promoting postoperative re-accumulation. The placement of subgaleal suction catheter could prevent the collection of subdural air, thus minimizing the risk of recurrence [3]. Intraoperative saline flushing, avoiding nitrous oxide and supine position could help in preventing pneumocephalus [21]. Introduction of saline in the cavity rather than air facilitates earlier expansion of the cerebrum [22]. Burr hole should be at the highest point to reduce pneumocephalus and the recurrence rate [20].

One of the major reservations of a drain is that it may not be effective to reduce recurrence while the infective complications could be more after drain insertion. Although we did not encounter any infection in our series, subdural empyemas have been reported after subdural drain [17, 19, 23-25]. Postoperative infection in the subgaleal space has also been reported after subgaleal drainage [3].

## Conclusion

Chronic sub dural hematoma is a common presentation to the neurosurgeon. The present retrospective, comparative study of evacuation of chronic SDH with subgaleal suction drain, and without drain were compared and found to be an effective

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