

# Prospective Study Of Prognostic Factors In Single Vs Double Burr Hole Drainage For Ipsilateral Frontotemporoparietal Chronic Sdh In Tertiary Centre

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## ABSTRACT

**Objective:** To compare the efficacy of single versus double burr-hole for drainage of chronic subdural hematoma, keeping in consideration pertinent demographic, pre and postoperative associations.

**Methods:** A prospective cohort study carried out in Stanley Medical College Hospital, Chennai, (August 2023 - January 2024), on adults with diagnosed chronic subdural hematoma (CSDH); being segregated by randomized control trial, non-probability purposive sampling into Group-A and Group-B (who underwent single and double burr-holes for CSDH-drainage respectively). Utilizing SPSS-21, data expressed as frequencies/percentages and mean  $\pm$  standard deviation (SD) and cross-tabulated; p-value  $< 0.05$  was taken as significant.

**Results:** Age and GCS scores were  $62 \pm 13.694$  (range 38-94) and  $11.00 \pm 3.350$  (range 5-15) respectively, males being 40(66.7). Post-operative fatality was one in each single burrhole and double burrhole in chronic SDH, While Post operative seizures seen 3 patients(5%) in single burrhole while 5 patients (8.33%) in double burrhole in chronic SDH. Recurrence of hematoma Post operative in single burr-hole done in chronic SDH is 8 (13.33%), double burrhole done in chronic SDH is 6 (10%) 17(35%) patients with both single & double burrhole for chronic SDH stayed in hospital for less than 5 days, 11(18.33%) and 10(16.6%) patients stayed for 5 to 15 days in single burrhole and double burrhole in chronic SDH; 2(3.33%) patients and 3(5%) patients stayed in respectively single and double burrhole in chronic SDH. Hospital stay and seizures were inversely proportional to GCS scores on presentation. Recurrence rates were not affected by age or gender. Duration of surgery for Single burrhole in chronic SDH takes  $35(\pm)10$  minutes then in Double burrhole in chronic SDH takes  $55(\pm)10$  minutes

**Conclusion:** In single burrhole in chronic SDH has higher recurrence than double burr-hole in chronic SDH, post operative seizure higher incidence in double burrhole than in single burrhole in chronic SDH Hence double burrhole in chronic SDH is always better in terms of post operative recurrence of hematoma. GCS-score on presentation was validated as a negative association to anticipate post-operative outcomes.

**KEYWORDS:** Glasgow Coma Scale, Seizures, Recurrence, Chronic SDH (Subdural Hemorrhage).

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## I. INTRODUCTION

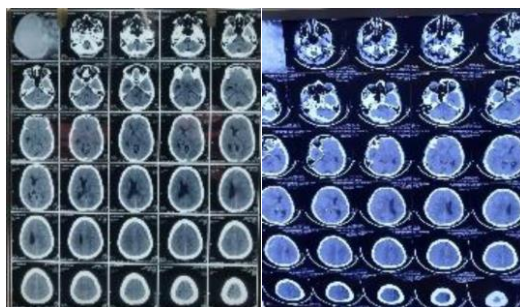
Subdural hematoma (SDH) is accumulation of blood between dura-mater and brain surface. Chronic subdural hematoma (CSDH) is one of the most frequently encountered malady in neurosurgical clinics.<sup>1</sup> It is generally considered as benign and easily treatable problem with an increasing incidence with age.<sup>2-4</sup> If not timely diagnosed or treated, it carries significant morbidity or mortality and vice versa; and is also a treatable cause of stroke and dementia in peculiar groups. Majority being post-traumatic, often following minor head trauma,<sup>4</sup> rest are mostly preceded by coagulation defects, intracranial hypotension, repeated intra cranial hemorrhage, increased outer membrane exudates, or occlusion of cerebrospinal fluid.<sup>1</sup> Administration of anti-coagulants/ antithrombotic drugs has been established as a vital iatrogenic factor.<sup>5</sup> It develops subtly over days or weeks, and may remain undiagnosed for even months or even a year. Clinical presentation may vary from no symptoms to unconsciousness.<sup>1</sup> Most patients present with GCS score 12 or more and without loss of consciousness.<sup>6</sup> Clinical outcomes are inversely proportional to neurological status at presentation;<sup>3,7</sup> GCS lesser than 8 anticipates poor prognosis. It is a frequently missed clinical entity; those with modest symptoms (headaches, memory disorders, balance disorders, cognitive disorders etc.) are often misinterpreted as signs of dementia, circulatory failure-basilar vertebra or Alzheimer's disease.<sup>4</sup> The role of apt clinical assessment and radiological imaging to rule out CSDH cannot be overemphasized. Diagnosis depends upon size of lesion and

hematoma's intima, history of fresh hemorrhage/hemolysis, and any associated primary or metastatic dural disease. Simple radiological scans like cerebral CT scans often highlight these hematomas; while early neurosurgical intervention validate favorable prognosis.<sup>1,4</sup> When the cause is unknown, the color of the hematoma on neuroimaging study can hint towards duration of lesion. There may be hypodense chronic lesions, or mixed density images of acute on chronic bleed. These slowly progressive bleeds may stop without considerable damage. Literature revealed that only 22% of patients with chronic subdural hemorrhage had outcomes worse than "good" or "completely recovered".<sup>8</sup> Timely and optimum management averts grave complications.<sup>3</sup> Treatment is aimed to return every patient to previous daily life, and is often achievable.<sup>4</sup> A multitude of surgical drainage procedures are available but clear-cut guidelines are jeopardized and scanty. Single or double burr hole drainage is the first-line therapy, being most effective and frequently utilized, with minimal co-morbidities, complications and recurrence.<sup>1,2</sup> Nonsurgical management is reserved for asymptomatic or patients at high risk for operation.<sup>1</sup> Burr-hole craniotomy (also known as trepanning, trepanation, trephining, trephining) is a time-tested intervention in which a hole is drilled or scraped into the human skull, exposing the dura-mater to release pressured blood build-up from an injury or manage issues pertinent to intracranial diseases.<sup>9</sup> Various international researchers have compared the single-hole and double-hole drilling, but unfortunately reported follow-up periods are short-lived, often limited to acute hospitalization.<sup>3</sup> Although neurosurgical emergency in Stanley Medical College Hospital frequently manage clients of CSDH, nevertheless, formal studies are skimpy and no such study has yet been conducted at subject hospital. This is the pioneer survey of its type which aimed to compare outcomes of two types of burrhole surgeries in terms of hospital stay, seizures or recurrence; simultaneously keeping in mind age, gender, site of hematoma, coagulation profile and GCS-scores at presentation. Sub-dural drainage and irrigation was administered to all patients because of their validated outcomes. Questions posed were, is there any difference in outcomes of two types of burr-hole drainage for CSDH and what the significant prognostic associations are. The research is anticipated to generate interesting results and provide with a way forward to scientists for conduction of better researches in similar populations with expanded sample and extended variables.

## II. METHODS

This prospective cohort study was carried out in department of neurosurgery, under the kind auspices of Stanley Medical College Hospital, Chennai, from August 2023 - January 2024; preceded by formal approval by Ethical Review Board, and written informed consents by patients (or wards of comatose personnel). Patients were allocated into two groups by randomized control trial; 30 persons in each group. Symptomatic adults with diagnosed chronic subdural hematoma via CT/MRI scans were included, while those < 18 years age, already operated for CSDH, with post CSF diversion CSDH or with prior history of seizures, coagulopathies or intake of anti-coagulants were excluded by nonprobability purposive sampling. Patients who lost post-operative follow-up were replaced by other eligible cases.

Group-A and Group-B underwent single and double burr holes drainage respectively (all with sub-dural drain and irrigation). Detailed management encompassed optimum history and examination, Glasgow coma scale on presentation, side of hematoma, hospital stay, coagulation profile, postoperative seizures, recurrence of hematoma, laboratory investigations and imaging studies. Coagulation parameters included platelet count, prothrombin time (PT) and activated partial thromboplastin time (APTT). At the time of imaging, CSDH was analysed as low density or mixed, based on density of hematoma relative to brain tissue. Patients with GCS 8 or less were operated under local anaesthesia; rest under general anaesthesia. After surgery, depending upon neurological status, they were nursed in intensive care unit or neurosurgery room. Stable patients were then discharged. Any evidence that followed them for a month showed signs of relapse and regeneration. Data analysed via SPSS-21, qualitative expressed as frequency and percentage, summed up as mean±standard deviation (range minimum maximum). Dependent variables (hospital stay, recurrence and seizures) were cross-tabulated with independent variables via Chi-square; p-value <0.05 was taken as significant.



**Single Burr hole left ftp sdhpre-op scan**

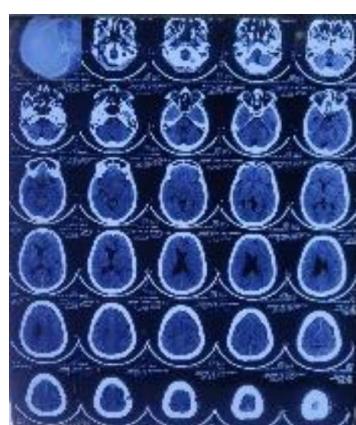
**Pre-op scan double burr hole**



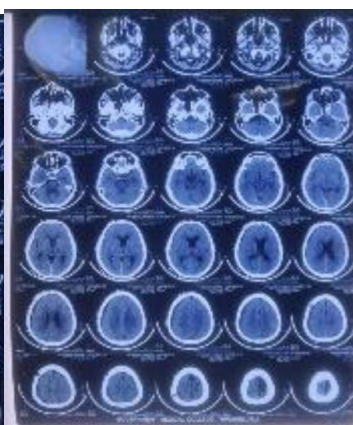
Single Burr hole



Double Burr hole



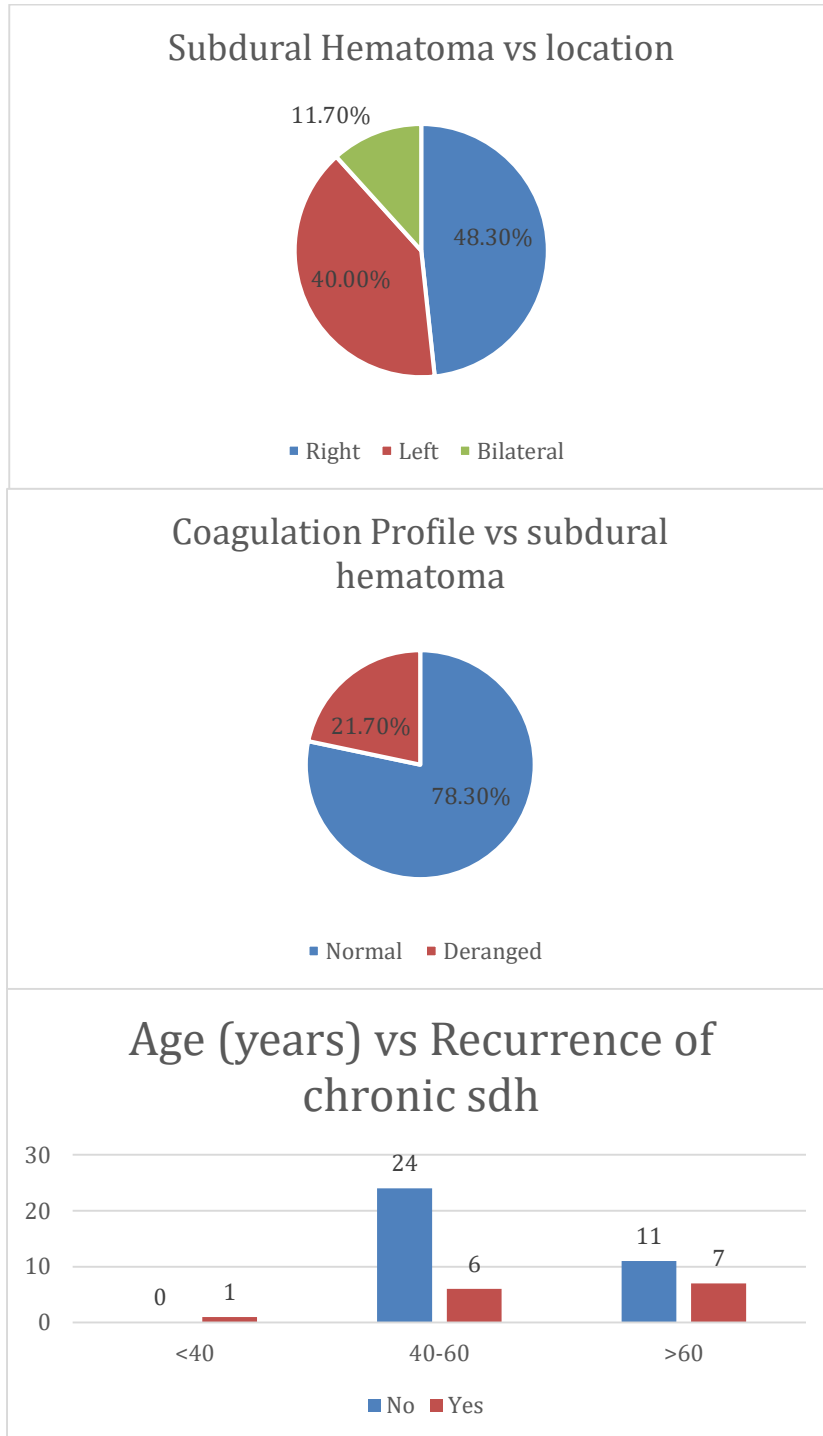
Post op scan of single burr-hole

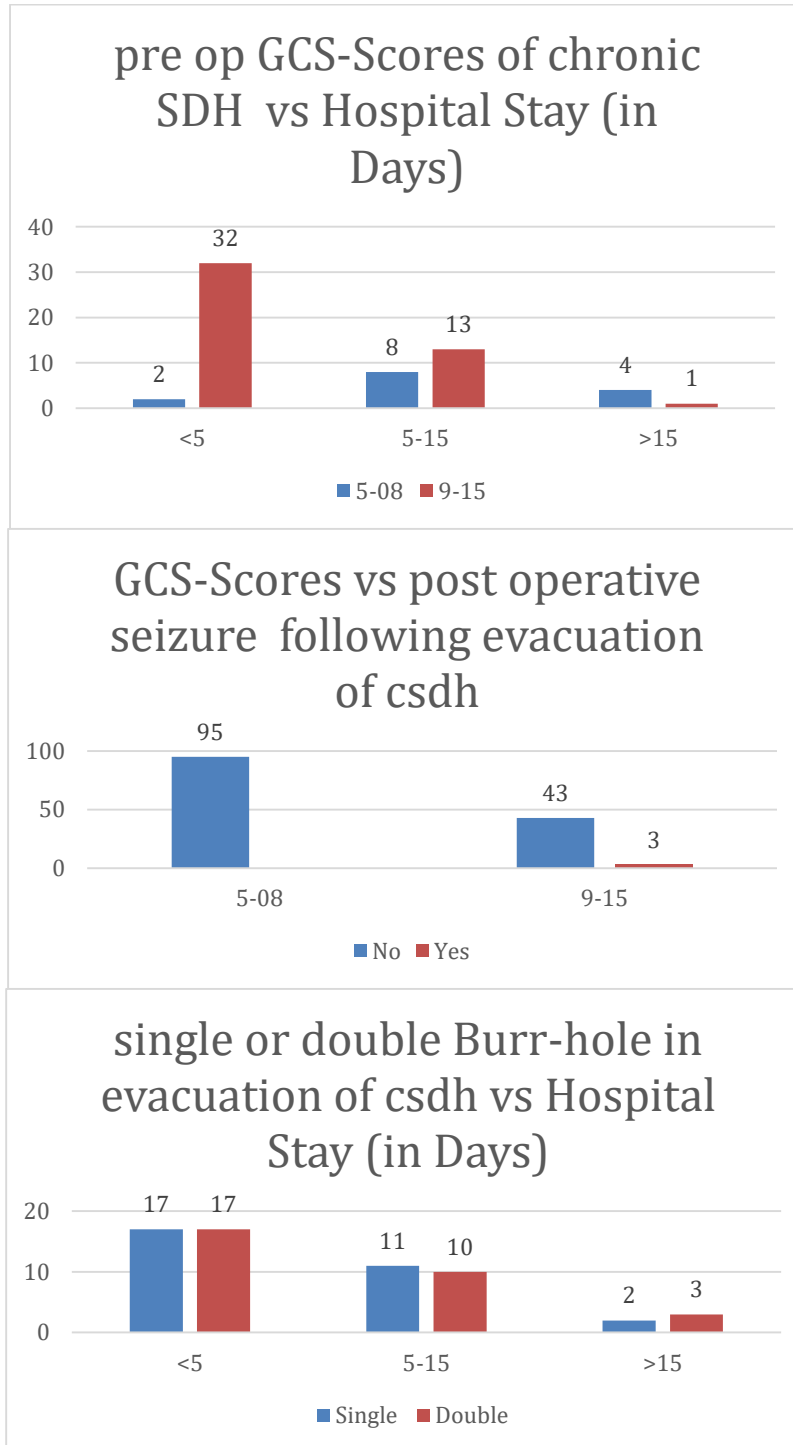


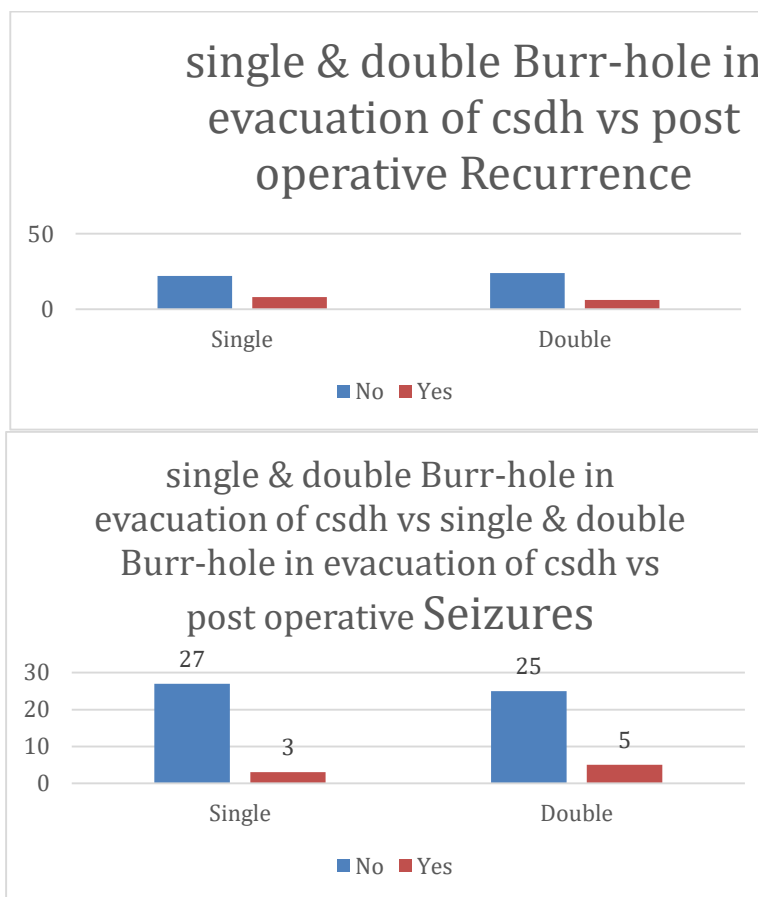
Post-op scan double burr hole

### III. RESULTS

Variable	Frequency (Percent)	Hospital Stay (Days)			Recurrence		Seizures	
		<5	5-15	>15	No	Yes	No	Yes
<b>Age (years)</b>		p-0.904			p-0.175		p-0.662	
<40	1(1.7)	1	0	0	0	1	10	
40-60	30 (50.0)	16	11	3	24	6	27	3
>60	29 (48.3)	17	10	2	11	7	24	5
<b>Gender</b>		p-0.432			p-0.281		p-0.788	
Male	40 (66.7)	25	12	3	29	11	35	5
Female	20 (33.3)	9	9	2	17	3	17	3
<b>GCS-Scores</b>		p-0.0001			p-0.211		p-0.005	
5-8	14(23.3)	2	8	4	9	5	95	
9-15	46(76.7)	32	13	1	37	9	43	3
<b>Hematoma</b>		p-0.898			p-0.879		p-0.001	
Right	29(48.3)	18	9	2	23	6	26	3
Left	24(40.0)	13	9	2	18	6	23	1
Bilateral	7(11.7)	3	3	1	5	2	34	
<b>Coagulation Profile</b>		p-0.145			p-0.499			
Normal	47(78.3)	27	16	4	38	9	40	7
Deranged	13(21.7)	7	5	1	8	5	12	1
<b>Burr-hole</b>		p-0.884			p-0.542		p-0.448	
Single	30 (50.0)	17	11	2	22	8	27	3
Double	30(50.0)	17	10	3	24	6	25	5







	Duration of Surgery (in mins)	Mortality
<b>Single burrhole</b>	35±10	1
<b>Double burrhole</b>	55±10	1

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#### IV. DISCUSSION

Neurosurgeons quite frequently deal with chronic subdural hematomas. where low pressure venous hemorrhage from bridge vein strips the arachnoid from dura. Small subdural hematomas may occur repeatedly and absorbed spontaneously. A large amount of subdural blood usually organizes and forms a vascular membrane surrounding the hematoma. Repeated bleeds in small and friable vessels within these membranes may be responsible for the growth of chronic subdural hematomas have described the pathophysiological development of CSDH.

#### V. CONCLUSION

In single burrhole in chronic SDH has higher recurrence than double burr-hole in chronic SDH, post operative seizure higher incidence in double burrhole than in single burrhole in chronic SDH Hence double burrhole in chronic SDH is always better in terms of post operative recurrence of hematoma. GCS-score on presentation was validated as a negative association to anticipate post-operative outcomes. Single burr hole drainage consumes less operative time than double burrhole in chronic SDH.

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