

Chronic Subdural Hematoma: Our Experience in Tertiary Care Centre

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Abstract: ***Aim and Objectives:** Chronic subdural hematoma is one of the most commonly seen neurological disorders. The purpose of this study is to analyse the chronic SDH patients in tertiary care centre and to correlate association of cardiac diseases and radiological types with recurrence. **Methods:** This is a retrospective observational study of 150 consecutive patients with chronic SDH admitted at Institute of Neurosurgery, Rajiv Gandhi Government General Hospital during 3 years period from 2019 to 2022. The data were obtained from medical records which include demographic features, clinical presentations, prior trauma history, associated comorbid illnesses, anticoagulants history, radiological features, surgical options, recurrence, complications and outcome. All patients with chronic SDH irrespective of the age were included in this study. **Results:** The collected data were analysed with IBM SPSS Statistics software. In this study age group 41 - 60 years were predominant (n=69, 46%) and male preponderance with male: femaleratio of 3.4: 1. The most common clinical symptom observed was headache (n=130, 86%) followed by limb weakness (n=113, 75%). 89 patients admitted with GCS 15 (60%), 47 patients with GCS 9 to 14 (31%), 14 patients with GCS less than 8 (9%). History of prior head trauma including trivial injuries was present in 88% of patients (n=133). Comorbid illnesses include systemic hypertension (n=63, 42%), Diabetes mellitus (n=67, 44%), cardiac diseases with intake of antiplatelet/anticoagulant drugs (n=47, 31%) and liver disease (n=8, 5%). Left sided involvement (n=70, 47%) were more common. 85 patients (56%) had homogenous type, 35 patients (24%) had separated type, laminar type in 20 patients (14%), trabecular type in 10 patients (6%). All patients underwent surgical evacuation of chronic SDH. Recurrence was observed in 20 patients (13%). Recurrences were more common in patients with cardiac diseases on antiplatelet/anticoagulant drugs (n=15) compared to patients with no cardiac disease (n=5) with statistically significant p value of.00001. Of the radiological types, separated type is associated with statistically significant recurrences with p value of.001231.139 patients (92%) showed clinical improvement following surgical evacuation of chronic SDH. **Conclusion:** Recurrence following surgery greatly increases the morbidity and mortality. Recurrence rate was found to be high in patients with cardiac diseases taking antiplatelet/anticoagulant drugs and in patients having separated type of chronic SDH.*

Keywords: Chronic subdural hematoma, cardiac diseases, recurrences

Abbreviations: SDH - Subdural Hematoma, GCS - Glasgow coma scale

1. Introduction

Chronic subdural hematoma is one of the most commonly encountered neurological disorders and is more prevalent among the elderly population. The annual incidence among the general population is 5 per lakh which is higher among those aged above 70 years with a strong male predominance with a male: female ratio of 3: 1. Head trauma is observed in more than 50% of the cases. The other risk factors are alcohol abuse, bleeding diathesis, antiplatelet/anticoagulant intake, risks of frequent falls, seizures and after CSF shunts. Surgical evacuation is the mainstay of treatment for chronic SDH causing mass effect. Recurrence following the surgery is also common especially more so in patients on antiplatelet/anticoagulant drugs.

2. Aim of the Study

The purpose of this study is to analyse the chronic SDH patients in tertiary care centre based on varied clinical presentations, risk factors, surgical options, recurrences, outcome and to correlate the association of cardiac diseases and radiological appearance of chronic SDH with recurrence.

3. Materials and Methods

This is a retrospective observational study of 150 consecutive patients with chronic SDH admitted at Institute

of Neurosurgery, Rajiv Gandhi Government General Hospital during 3 years period from 2019 to 2022. The data were obtained from medical records and hospital insurance records.

The collected data include demographic features, clinical presentations, prior trauma history, associated comorbid illnesses, anticoagulants history, radiological features, surgical options, history of recurrence and management, complications and outcome. All patients with chronic SDH irrespective of the age were included in this study.

Chronic SDH was diagnosed by computed tomography and all patients were admitted and evaluated with routine blood investigations. History of prior trauma and comorbid illnesses were obtained. 47 out of 150 patients were known cardiac patients taking antiplatelet/anticoagulant were which were withheld on admission. Coagulation parameters if abnormal were corrected with fresh frozen plasma and platelets transfusion. All the patients were operated on the same day of admission. The surgical options were burr hole craniostomy and evacuation, craniotomy or decompressive craniectomy depending on the CT appearance of chronic SDH. Based on CT appearance of the density changes, chronic SDH was divided into 4 types as homogenous, separated, laminar, trabecular as described in table 1 and illustrated in representative patients' images in Figure 1.

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The patients were managed with antiepileptics and higher intravenous antibiotics. Postoperative imaging was done 2 days after surgery and repeat imaging done one day before discharge. Glove drain if kept was removed on 2nd postoperative day. Patients with poor GCS were maintained on ventilator support. Complications during the course of treatment such as recurrences identified on postoperative imaging were managed with re - exploration by evacuation through the previous burr holes or decompressive craniectomy and evacuation. Hyponatremia were treated with hypertonic (3%) saline, wound infection managed with appropriate antibiotics as per culture sensitivity reports. 11 patients were expired despite effective management due to poor GCS throughout the course of treatment.

Table 1: Computed Tomography appearance of Chronic SDH – 4 types

TYPES	IMAGING APPEARANCE
Homogenous	Homogenous density (hypo - , iso - , hyper -)
Separated	Contains 2 components of different densities with lower density component lying above the higher density component with clear boundary between them. Gradation subtype - indistinct boundary between the 2 components.
Laminar	Contains high density laminar structure running along the inner membrane which constitutes fresh blood originated from the hematoma membrane
Trabecular	Contains inhomogenous contents which features high density fibrous septa running between the inner and outer membrane.

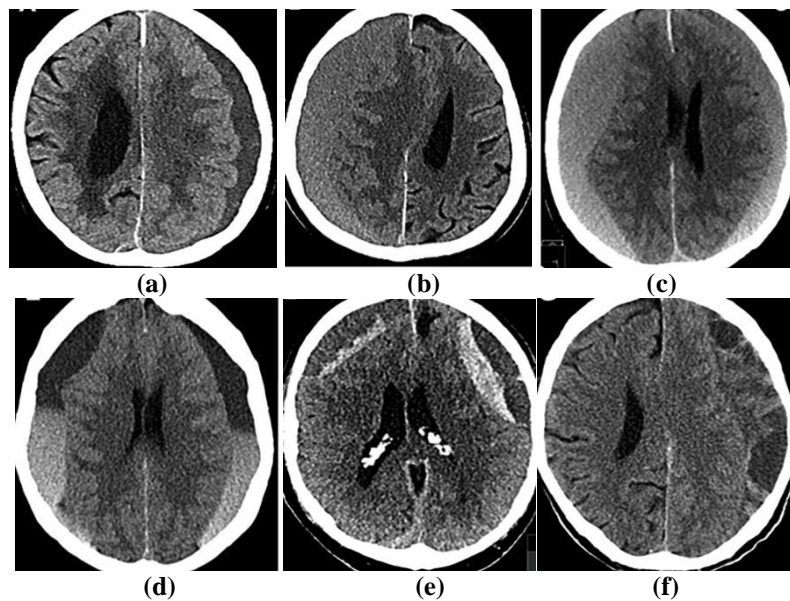


Figure 1: Representative CT Brain images of patients - a) homogenous type (hypodense), b) homogenous type (isodense), c) homogenous type (hyperdense), d) separated type, e) laminar type, f) trabecular type.

4. Results

The collected data were analysed with IBM SPSS Statistics software for Windows, Version 23.0. (Armonk, NY: IBM Corp). To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean used for continuous variables. To find the significance in categorical data Chi - Square test was used with the probability value.05 is considered as significant level.

Table 2

Characteristics	Results - n (%)
DEMOGRAPHY	
Age groups:	
0 - 20 years	5 (3%)
21 - 40 years	16 (11%)
41 - 60 years	69 (47%)
61 - 80 years	7 (37%)
81 - 100 years	3 (2%)
Sex:	
Males	116 (77%)
Females	34 (23%)
Male: female ratio	3.4: 1

Table 3

Characteristics	Results n (%)
CLINICAL FEATURES	
Headache	130 (86%)
Vomiting	62 (41%)
Altered sensorium	60 (40%)
Seizures	25 (16%)
Limb weakness	113 (75%)
Dysphasia	73 (48%)
ADMISSION GCS	
15	89 (60%)
9 to 14	47 (31%)
Less than 8	14 (9%)
TRAUMA HISTORY	
Yes	133 (88%)
No	17 (12%)
COMORBID ILLNESSES	
Systemic hypertension	63 (42%)
Diabetes mellitus	67 (44%)
Cardiac diseases (on antiplatelet/ anticoagulant drugs)	47 (31%)
Liver diseases	8 (5%)
RADIOLOGY	
Side:	
Right	60 (40%)

Left	70 (47%)
Bilateral	20 (13%)
Imaging features:	
Homogenous	85 (56%)
Separated	35 (24%)
Laminar	20 (13%)
Trabecular	10 (7%)

With cardiac diseases	15 (75%)
Without cardiac diseases	5 (25%)
Homogenous type	
Separated type	11 (55%)
Laminar type	3 (15%)
Trabecular type	2 (10%)
	n (% of total)
Hyponatremia	15 (10%)
Wound infection	5 (3%)
Wound gaping	2 (1%)
GCS drop on ventilator support	17 (11%)
POST OPERATIVE GCS	
15	120 (80%)
9 to 14	20 (14%)
Less than 8	10 (6%)
OUTCOME	
Clinical improvement	139 (93%)
Expired	11 (7%)

Table 4

Characteristics	Results
SURGICAL OPTIONS	
Burr hole craniostomy	120 (80%)
Craniotomy	21 (14%)
Decompressive craniectomy	9 (6%)
COMPLICATIONS	
Recurrence	
Yes	20 (13%)
No	130 (87%)
	n (% of recurrence)

Table 5: Shows comparison of recurrences between the patients with cardiac diseases (on anticoagulants) and patients without cardiac diseases using Chi - square test

Groups	Recurrence	No recurrence	Total
With cardiac diseases	15 (6.27) [12.17]*	32 (40.73) [1.87]	47
Without cardiac diseases	5 (13.73) [5.55]	98 (89.27) [0.85]	103
Total	20	130	150

* - n (expected cell total) [chi - square statistic]

The Chi - square statistic is 20.4515 with p - value <.00001. The result is significant at p<.05

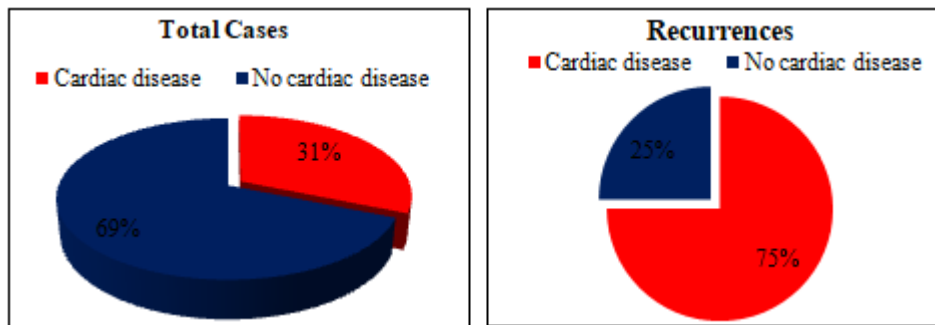


Figure 2: Shows comparison of recurrences between the patients with cardiac diseases and patients without cardiac diseases

Table 6: Shows comparison of recurrences among the various radiological types using Chi - square test

Types	Recurrence	No recurrence	Total
Homogenous	4 (11.33) [4.75]*	81 (73.67) [0.73]	85
Separated	11 (4.67) [8.60]	24 (30.33) [1.32]	35
Laminar	3 (2.67) [0.04]	17 (17.33) [0.01]	20
Trabecular	2 (1.33) [0.33]	8 (8.67) [0.05]	10
TOTAL	20	130	150

* - n (expected cell total) [Chi - square statistic]

The Chi - square statistic is 15.8254 with p - value is.001231. The result is significant at p<.05

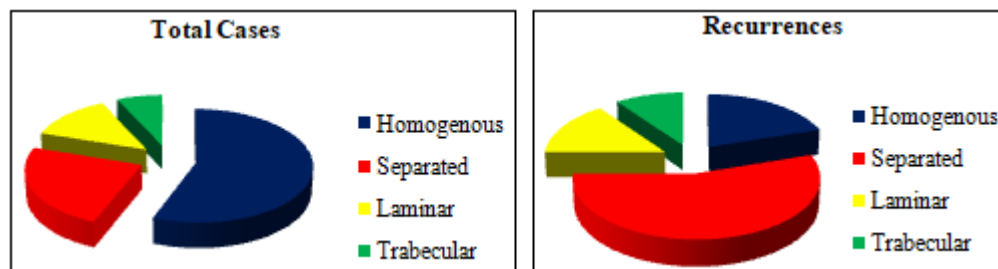


Figure 3: Shows comparison of recurrences among the various radiological types

Table 7: Shows comparison of Admission GCS and Postoperative GCS using Chi - square test

Groups	15	9 - 14	Less than 8	Total
Admission GCS	89 (104.50) [2.30]*	47 (33.50) [5.44]	14 (12.00) [0.33]	150
Postoperative GCS	120 (104.50) [2.30]	20 (33.50) [5.44]	14 (12.00) [0.33]	150

* - n (expected cell total) [Chi - square statistic]

The Chi - square statistic is 16.1453 with p - value.000312. The result is significant at $p < .05$

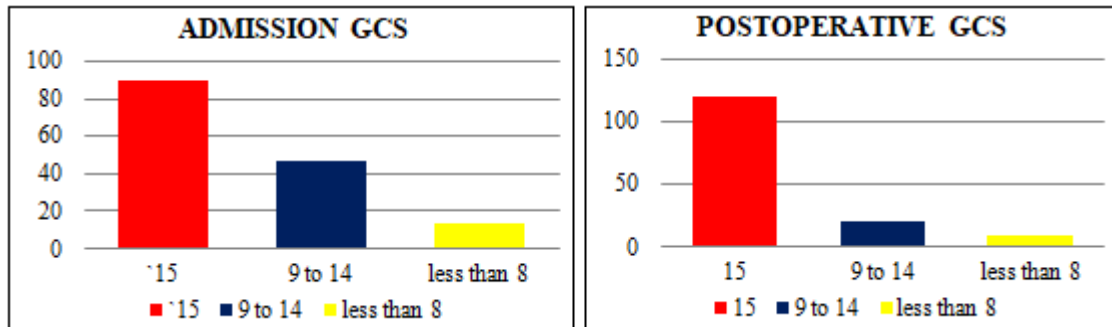


Figure 4: Shows comparison of Admission GCS and Postoperative GCS

5. Discussion

Of the 150 patients included in this study, age group 41 - 60 years were predominant (n=69, 47%) followed by 61 - 80 years age group (n=57, 37%) with mean age of 55.5 years. Male preponderance noted with 116 patients (77%) compared to females (n=34, 23%) with male: female ratio of 3.4: 1.

Headache was the most common clinical symptom observed (n=130, 86%) followed by limb weakness (n=113, 75%). Dysphasia occurred in 73 patients (48%), vomiting in 62 patients (41%), 60 patients had altered sensorium (40%), seizures in 25 patients (16%).

89 patients admitted with GCS 15 (60%), 47 patients with GCS 9 to 14 (31%), 14 patients with GCS less than 8 (9%). History of prior head trauma including trivial injuries was present in 88% of patients (n=133).

Comorbid illnesses include systemic hypertension (n=63, 42%), Diabetes mellitus (n=67, 44%), cardiac diseases with intake of antiplatelet/anticoagulant drugs (n=47, 31%) and liver disease (n=8, 5%)

On radiological imaging with CT brain, left sided involvement (n=70, 47%) were common than right side (n=60, 40%). Bilateral involvement occurred in 20 patients (13%). 85 patients (56%) had homogenous type, 35 patients (24%) had separated type, laminar type in 20 patients (14%), trabecular type in 10 patients (6%).

All patients underwent surgical evacuation of chronic SDH. 120 patients (80%) underwent burr hole craniostomy and evacuation, 21 patients underwent craniotomy (14%), 9 patients (6%) underwent FTP decompressive craniectomy and evacuation.

Postoperative complications include recurrence in 20 patients (13%) necessitated re - exploration, GCS drop requiring ventilator support in 17 patients (11%),

hyponatremia observed in 15 patients (10%), wound gaping in 2 patients (1%) and wound infection in 5 patients (3%).

Recurrences were more common in patients with cardiac diseases on antiplatelet/anticoagulant drugs (15 patients) compared to patients with no cardiac disease (n=5) which is statistically significant with a p value of.00001. Of the radiological types, separated type is associated with statistically significant recurrences with p value of.001231.

On analysing the outcome, 139 patients (92%) showed clinical betterment following surgical evacuation of chronic SDH in the form of improved weakness, dysphasia and sensorium. Compared to admission GCS, postoperatively the number of patients with GCS 15 increased to 80% (vs 60% on admission), patients with GCS 9 - 14 decreased to 14% (vs 31% on admission) and patients with GCS less than 8 decreased to 6% (vs 14% on admission) which is statistically significant with p - value of.000312.

11 patients (7%) expired who were readmitted with poor GCS less than 8, with postoperative recurrence and re - exploration, postoperative deterioration with ventilator support.

6. Conclusion

Chronic SDH is frequently encountered neurological disorder and surgical evacuation provides excellent clinical outcome with improvement of symptoms. Recurrence following surgery poses great challenge in management and increases the morbidity and mortality. Recurrence rate is found to be high in patients with cardiac diseases taking antiplatelet/anticoagulant drugs and in patients having separated type of chronic SDH.

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