

The Incidence And Different Risk Factors For The Recurrence Of Chronic Subdural Hematoma: A Retrospective Study

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Abstract

Background and Aim: Chronic subdural hematoma is a neurosurgical condition that represents degradation of liquefied blood collected abnormally beneath the dura that typically forms within three weeks. The recurrent rates of chronic subdural hematoma after surgery varies from 5% to 30%. However, different risk factors that lead to recurrent chronic subdural hematoma remain debatable. Therefore, the present study aimed to determine the incidence and different risk factors for recurrent chronic subdural hematoma.

Methodology: A retrospective study was conducted on 206 chronic subdural hematoma patients admitted to the Department of Neurosurgery, Lady Reading Hospital, Peshawar Pakistan for the duration from 1st July 2020 to 30th June 2022. Prior to study conduction, ethical approval was taken from the institute ethical committee. Demographic details, trauma history, surgical intervention types, antithrombotic therapy, surgical drain usage, preoperative symptoms, postoperative symptoms, and clinical outcomes were retrieved from the medical record. SPSS version 25 was used for data analysis.

Results: Out of 206 chronic subdural hematoma patients, there were 164 (79.6%) males and 42 (20.4%) females. The overall mean age was 62.9±16.2 years. The prevalence of recurrent chronic subdural hematoma was 28 (13.6%). The incidence of previous head trauma was found in 138 (67%) patients. The prevalence of left-side, right-side, and bilateral hematoma was 82 (39.8%), 58 (28.2%), and 66 (32%) respectively. In terms of hematoma density, the incidence of homogeneous hypo-dense, homogenous iso-dense, homogeneous hyperdense type, laminar type, separated type, and trabecular type were seen in 40 (19.4%), 46 (22.3%), 16 (7.8%), 10 (4.9%), 36 (17.4%), and 58 (28.2%) respectively. The overall mean of drainage time after initial intervention was 1.6±0.8 days. All the patients underwent successful chronic subdural hematoma surgery.

Conclusion: The present study found that the prevalence of recurrent chronic subdural hematoma was 13.6%. Male patients are more susceptible to chronic subdural hematoma recurrence compared to female patients. Post-surgery subdural drainage duration and homogeneous hyper-dense hematoma were the independent prognosticator of recurrent chronic subdural hematoma. The risk of recurrence was lower in cases where postoperative drainage of the subdural had longer duration.

Keywords: Risk factors, Chronic subdural hematoma, Recurrent chronic subdural hematoma

INTRODUCTION

Elderly patients are more susceptible to CSDH and affecting 1 in 10,000 people [1]. CSDH is a neurosurgical disorder that represents degradation of liquefied blood collected abnormally beneath the dura that typically form within three weeks [2, 3]. The increasing use of anticoagulant and antiplatelet drugs and advancement of age contributes to growing incidence of chronic subdural hematoma [4]. Craniotomy, closed drainage system, twist drill trephination, and burr hole with or without irrigation are different surgical procedures for the chronic subdural hematoma treatment [5-6]. Lately, the most prevalent procedure performed is burr-hole procedure due to less invasive nature. The drainage tube placement either anteriorly or posteriorly are yet to be determined in order to prevent the chronic subdural hematoma recurrence [7]. The occurrence of recurrent CSDH varies from 5% to 30% [8, 9].

Complex clinical situations, patient's poor outcomes, and increased psychological burden might lead to the recurrence of chronic subdural hematoma which poses a major challenge for neurosurgeons [10]. Additionally, the chronic subdural hematoma mechanism is still unknown. Consequently, determining different aspects associated to the recurrence of CSDH may benefit postoperative management and treatment. Age, density of hematoma, body mass index, anticoagulant agents or antiplatelet usage, and separated hematoma are the different risk factors proposed for the recurrence of chronic subdural hematoma [11-13]. The recurrence of chronic subdural hematoma impacts overall fatality rate [14]. Numerous studies found that bleeding tendency, hematoma width, bilateral CSDH, hematoma density, and collection of postoperative subdural air are different risk factors for the recurrence of CSDH [15, 16]. The present study aimed to determine the incidence and different risk factors for the recurrence of CSDH.

METHODOLOGY

A retrospective study was conducted on 206 chronic subdural hematoma patients admitted to the Department of Neurosurgery, Lady Reading Hospital, Peshawar Pakistan for the duration from 1st July 2020 to 30th June 2022. Prior to study conduction, ethical approval was taken from the institute research and ethical committee. Demographic details, trauma history, surgical intervention types, antithrombotic therapy, surgical drain usage, preoperative symptoms, postoperative symptoms, and clinical outcomes were retrieved from the medical record. Demographic details and clinical data included age, weight, gender, height, previous history of head trauma were extracted from the medical record. Diabetes mellitus, anticoagulant agent's usage, hypertension, cardiac vascular disease, post-operative subdural drainage duration, and time between first operation and recurrence were retrieved from the case record. Burr-hole craniotomy was done in all the patients after admission for treatment of chronic subdural hematoma. General anesthesia was used for drilling the burr-hole with maximum hematoma width. Hematoma was expatriate followed by irrigation using normal saline in subdural activity. Inside the subdural space, silicon catheter was inserted after irrigation in a closed drainage system allied to the catheter. Upon the indication of prolonged drainage, catheters were removed after 1 day of 2 days. After surgery, a routine CT scan of the postoperative head was performed after 24 hours. Each individual underwent preoperative CT imaging of the head in order to evaluate the clinical conditions. Hematoma density, midline shaft, and location of hematoma were assessed. Based on the density of hematoma, four different types were as follows; laminar, iso-dense, trabecular, homogeneous hypo-dense, homogeneous hyper dense, and separated type.

SPSS version 25 was used for data analysis. Quantitative variables such as age, body mass index were described as mean and standard deviation. Qualitative variables such as gender, pre-existing diseases, and density of hematoma etc. were expressed as frequency and percentage. Student's t-test was used for comparing the continuous variables whereas Chi-square test was used for comparing categorical variables. Chronic subdural hematoma different risk factors were analyzed by logistic regression. All the descriptive statistics were carried out using 95% confidence interval and 5% level of significance.

RESULTS

Out of 206 chronic subdural hematoma patients, there were 164 (79.6%) males and 42 (20.4%) females. The overall mean age was 62.9±16.2 years. The prevalence of recurrent chronic subdural hematoma was 28 (13.6%). The incidence of previous head trauma was found in 138 (67%) patients. The prevalence of left-side, right-side, and

bilateral hematoma was 82 (39.8%), 58 (28.2%), and 66 (32%) respectively. In terms of hematoma density, the incidence of homogeneous hypo-dense, homogenous iso-dense, homogeneous hyperdense type, laminar type, separated type, and trabecular type were seen in 40 (19.4%), 46 (22.3%), 16 (7.8%), 10 (4.9%), 36 (17.4%), and 58 (28.2%) respectively. The overall mean of drainage time after initial intervention was 1.6 ± 0.8 days. All the patients underwent successful chronic subdural hematoma surgery. Table-1 represents the demographic details and baseline characteristics. Gender's distribution is illustrated in Figure-1. Figure-2 depicts the prevalence of left-side, right-side, and bilateral hematoma. Based on density, different types of hematoma are demonstrated in Figure-3. Table-II shows the univariate analysis of factors related to recurrence of chronic subdural hematoma. The recurrent rate compared with different types of hematoma as shown in Figure-4.

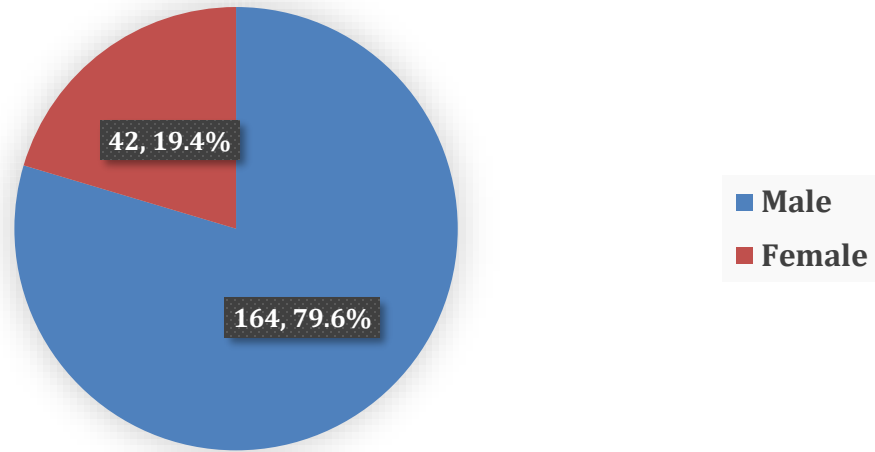


Figure-1 Gender's distribution (n=206)

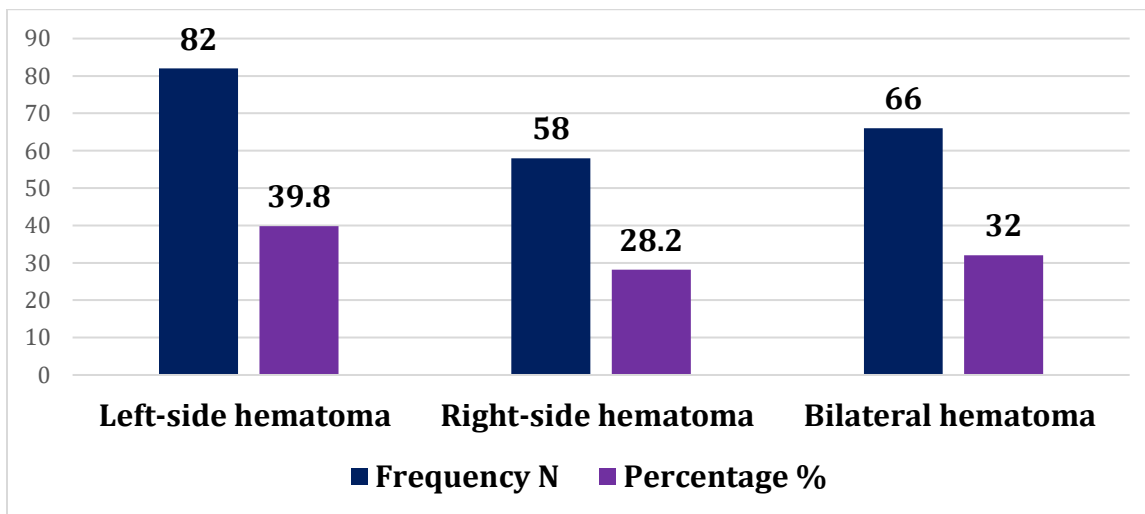


Figure-2 prevalence of left-side, right-side, and bilateral hematoma (n=206)

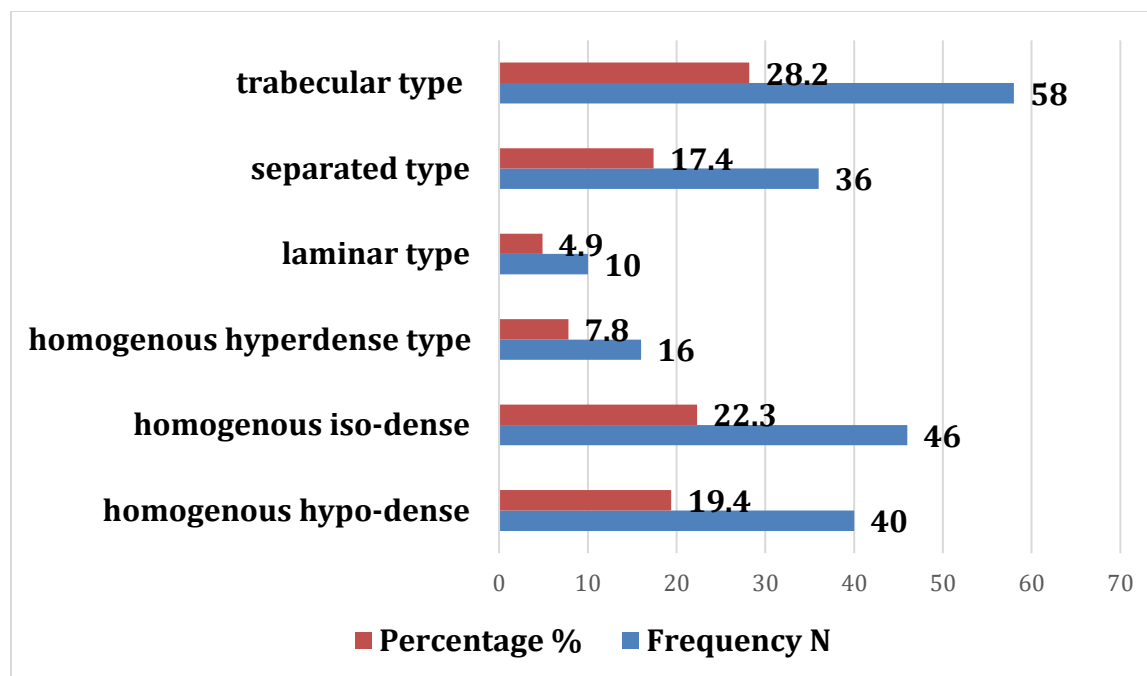


Figure-3 different types of hematoma based on density (n=206)

Table-I Demographic details and baseline characteristics

Parameters	Value
No of patients	206
Age (years)	62.9±16.2
Gender N (%)	
Male	164 (79.6)
Females	42 (19.4)
BMI (kg/m ²)	23.2±2.7
Midline shift N (%)	
≥ 1 cm	108 (52.4)
<1 cm	98 (47.6)
Pre-existing diseases N (%)	
Diabetes	12 (5.8)
Hypertension	64 (31.1)
Cardiovascular disease	9 (4.4)
Subdural drainage duration (days)	1.6± 0.8

Table-II univariate analysis of factors related to recurrence of chronic subdural hematoma

Parameters	Non-recurrent CSDH	Recurrent CSDH	P-value
No of patients	178	28	
Age (years)	63.61±15.34	62.19±17.06	0.492
Gender N (%)			0.531
Male	146 (82)	18 (64.3)	
Females	32 (18)	10 (35.7)	
BMI (kg/m ²)	22.9 ± 2.6	23.5±2.8	0.652
Midline shift N (%)			

≥ 1 cm	82 (46.1)	26 (92.9)	0.413
<1 cm	96 (53.9)	2 (7.1)	
Pre-existing diseases N (%)			
Diabetes	9 (5.1)	3 (10.7)	0.897
Hypertension	57 (32)	7 (25)	0.193
Cardiovascular disease	5 (2.8)	4 (14.3)	0.119
Subdural drainage duration (days)	1.7± 0.9	1.5± 0.7	0.021

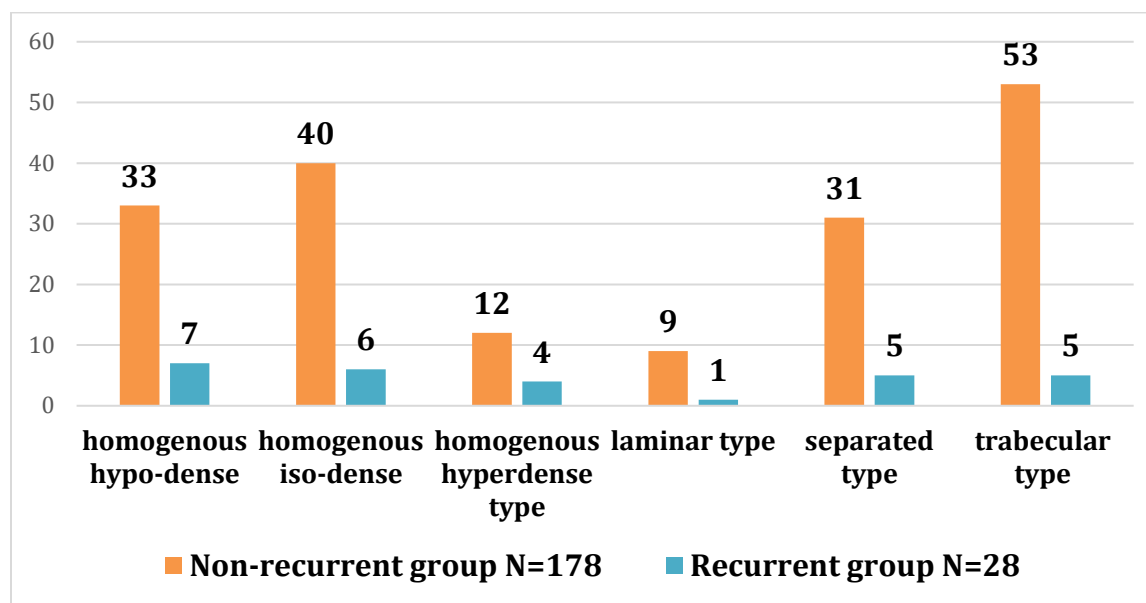


Figure-4 recurrent rate compared with different types of hematoma (n=206)

DISCUSSION

The present study investigated 206 chronic subdural hematoma for the recurrence rate and found that 13.6% patients had recurrent chronic subdural hematoma after surgery. Left-side hematoma was more prevalent hematoma followed by bilateral and right-side hematoma. Male patients were more susceptible to the recurrence of the chronic subdural hematoma. Based on the hematoma size, trabecular was the most common hematoma followed by homogenous iso-dense and homogeneous hypo-dense type. Among the patients with pre-existing diseases, hypertension was the most common one followed by diabetes and cardiovascular diseases. Post-surgery subdural drainage duration and homogeneous hyper-dense hematoma were the independent prognosticator of recurrent chronic subdural hematoma. The risk of recurrence was lower in cases where postoperative drainage of the subdural had longer duration. Previously conducted studies reported that the recurrence of hematoma were not significantly associated with different clinical data such as gender, age, use of anticoagulants, and use of antiplatelets [17, 18].

Chronic subdural hematoma is a prevalent neurosurgical condition that represents degradation of liquefied blood collected abnormally beneath the dura that typically forms within three weeks. Minimal invasive technique like burr-hole trephination is used for the chronic subdural hematoma treatment due to its simplicity and lower risk related to operation make it the initial choice of treatment [19]. However, the incidence of recurrent subdural hematoma varies from 2.3% to 30% [20, 21]. In the present study, the recurrence rate is 13.6%.

The chronic subdural hematoma recurrence etiology has not been completely cleared till to date but several risk factors such as age, hematoma density, bleeding tendency, bilateral chronic subdural hematoma, seizure, and post-operative posture could cause the chronic subdural hematoma recurrence [22-24].

In the present study, the prevalence of bilateral hematoma is 32% which is higher than the overall incidence that varies from 16% to 20% reported in various studies [25, 26]. Another study reported that chronic subdural hematoma recurrence could be caused by bilateral hematoma acting as a risk factor [27]. Re-expansion of the brain in poor postoperative condition is the basic reason for recurrent hematoma [28]. Similar results have been reported in which patients undergoing CSDH evacuation created hematoma re-accumulation in an enlarged subdural space [29]. Poor expansion of the brain is caused by previous brain atrophy in bilateral CSDH patients. Prolong coagulation time is another risk factor for bilateral CSDH [30].

Numerous studies investigated the association of hematoma recurrence and preoperative density of hematoma and some reported that no significant association was found while others concluded that higher recurrence rate of hematoma was due to hyper-dense, trabecular, and mixed hematoma density [31, 32]. In our study, the hyper-dense hematoma was more susceptible to CSDH recurrence after surgery as revealed in univariate analysis by logistic regression. Similarly, another study found that high density hematoma patients had higher recurrence rate of CSDH [33].

There is discrepancy in association of recurrent rate of CSDH and administration of antiplatelet and anticoagulant. According to the previous study antiplatelet or anticoagulant usage was a considerable risk factor for the CSDH recurrence [34]. In the present study, recurrence rate of CSDH was significantly associated with anticoagulation at a higher level but not with low level. Numerous studies reported that postoperative drainage is another modifiable risk factor for the recurrence of CSDH. The lower and higher recurrence rate (3.1%-10.5% versus 17%-33%) has been substantially associated with or without drain postoperative conditions [35, 36]. A reduced recurrence rate of CSDH was 9.3% with no complications as a side effect due to subdural drainage used was reported in a randomized controlled trial [37].

Postoperative evaluation involved subdural space width, collection of subdural air, and midline shift degree. Some studies suggested that promotion of hematoma recurrence and inner and outer endomembrane impaired adhesion within the hematoma cavity leads to prolonged postoperative widening [38]. Similar to the findings of a previous study, no significance association was found but there was a trend for chronic subdural hematoma recurrence rate and postoperative air collection [39]. The drainage tube were removed after 24 hours postoperatively whereas in another study, catheter of drainage were removed after 48 hours [40].

CONCLUSION

The present study found that the prevalence of recurrent chronic subdural hematoma was 13.6%. Male patients are more susceptible to chronic subdural hematoma recurrence compared to female patients. Post-surgery subdural drainage duration and homogeneous hyper-dense hematoma were the independent prognosticator of recurrent chronic subdural hematoma. The risk of recurrence was lower in cases where postoperative drainage of the subdural had longer duration.

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