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Bilateral chronic subdural hematoma: clinical presentation, outcome and review literature. A single centre experience from India

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Keywords
bilateral CSDH, Glasgow coma scale, head injury, outcome

ABSTRACT

Study design: Prospective hospital-based study.

Background: Annual incidence of bilateral chronic subdural hematoma (CSDH) is increasing due to an increase in the ageing population, associated medical comorbidities such as haemodialysis, anticoagulant and/or antiplatelet therapy.

Objectives: 1. To determine the socio-demographic and clinical profile of bilateral CSDH patients. 2. To determine treatment outcome and its association with the socio-demographic profile.

Method: A prospective hospital-based study was carried out on 100 confirmed patients of bilateral CSDH. Information of patients such as socio-demographic profile, clinical presentation and laboratory investigation, along with treatment and outcome were recorded and analysed.

Results: Among 100 patients, male and female were 74% and 26%. The mean age of patients was 63.03±13.57 years. A history of head injury was reported by 49% of patients. The mean Glasgow coma scale (GCS) was 12.14±2.38. Common presenting symptoms were hemiparesis (69%), headache (58%), aphasia (18%) and complete loss of consciousness (16%). Clinical improvement was observed in 81% while 09% had no change, 06% shows clinical deterioration and 04% of patients die during treatment.

Conclusion: Bilateral CSDH is common in the elderly and prognosis is poor with increasing age however gender has no association with poor outcomes. More than 80% of patients recover with timely interventions.

Key message: Surgery leads to achieving good outcomes in cases of bilateral chronic SDH, but not all such patients will recover completely. Similarly, good functional outcomes can also be achieved in those presented early after symptom onset when managed promptly.

INTRODUCTION

A subdural hematoma (SDH) is collection of blood between the dura and the arachnoid membranes. SDH has been classified into three

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verities i.e. acute, sub-acute and chronic types. Acute SDH is usually caused by head injuries and is symptomatic within 24 hours of injury.[13] The Chronic subdural haematoma (CSDH) are usually characterized by history of trivial head trauma.[7] CSDH is an encapsulated collection of old blood, which can be liquefied and located between the dura mater and arachnoid. CSDH patient become symptomatic more than 2 weeks after the initial injury.[14] It was first described by Virchow in 1857 as "pachymeningitis haemorrhagica interna".

Incidence of bilateral CSDH is about 1-5.3 cases per one lac population. The incidence is increasing due to increase in aging population, associated medical comorbidities such as hemodialysis, anticoagulant and/or antiplatelet therapy.[10,8]

The presentation of CSDH could vary from no symptoms to focal neurological signs such as hemiplegia, seizures, confusion, decreased memory, and signs of raised intracranial pressure such as headache, vomiting, and papilledema. Patients may present with difficulty in speech, swallowing, and walking. There may be weakness or numbness of arms, legs, and face.[16,19] CSDH is usually diagnosed by CT scan. Hematomas usually present as hypodense lesions, but sometimes isodense or mixed density lesions can also be observed. They are concavo-convex, but rarely may mimic acute epidural hematomas.

CSDH can be surgically treated, which has the potential for significant improvement or even resolution of symptoms postoperatively although multiple surgeries may required which leads to multiple hospitalization and deterioration of activities of daily living.[6,18] There is lack of uniformity about the treatment strategies, such as the role of burr hole, twist drill, craniotomy, etc., in CSDH amongst various surgeons. There is also disparity regarding use of drain, irrigation, and steroid. In addition, bilateral CSDHs are operated unilaterally or bilaterally depending on symptoms or hematomavolume.[17] Bilateral sites of CSDH are identified as a risk factor for recurrence by some researchers.[11]

Materials and Methods

Study design: A prospective hospital-based study.

Study setting: Neurosurgery department of RNT Medical college, Udaipur, Rajasthan, India

Study period: From July 2013 to June 2021.

Study Population: All patients of bilateral CSDH admitted at neurosurgery department during study period.

Inclusion criteria: Patient of bilateral CSDH showed isodense to hypodense hematomas with respect to the adjacent brain at Computerized tomography (CT) scan.

Exclusion criteria: 1. Patient had concomitant occurrences of other types of traumatic brain injury; 2) CSDH had resulted from complications or history of prior neurosurgical procedures, such as craniotomy or cerebrospinal fluid shunting.

Sample size: 100

Study tools: 1) Individual case sheet. 2) CT scan report.

Method

A prospective hospital-based study was conducted at neurosurgery department on patients of bilateral CSDH admitted during July 2013 to June 2021. Based on inclusion and exclusion criteria, records of 100 bilateral CSDH patients were assessed and analysed. Information of socio-demographic profile, clinical presentation at the time of admission, associated medical comorbidities, routine investigation along with neuro-image findings, treatment and outcome were assessed. All informations were entered in individual case sheet. Ethical permission was taken from Institutional Ethic Committee before starting of study.

Statistical analysis

The collected data were compiled and tabulated using MS Excel 2010 and analyzed using statistical software SPSS trial version 20. Appropriated tables and figures were generated. The results were expressed in percentages. Chi-square test was applied to determine association. P value of < 0.05 was considered statistically significant.

Results

Records of 100 patients with radiologically confirm cases of bilateral CSDH were reviewed. Among 100 patients, 74 (74%) were male and 26 (26%) were female. Mean age of patient was 63.03±13.57 years. History of head injury was reported by 49% of patients. Underlying medical condition such as hypertension, diabetes mellitus, stroke and End Stage Renal Disease (ESRD) with hemodialysis was found among 58%, 38%, 19% and 04% of patients

respectively. Total 19% of patients were on antiplatelet therapy and 8% were on anticoagulant therapy at the time of admission. Glasgow coma scale (GCS) was assessed for each patient at admission and mean GCS was 12.14±2.38. (Table 1)

Table 1. Socio-demographic and clinical characteristic of study participants

Variables	Male (n=74)	Female (n=26)	Total
Mean age	63.81±12.33	60.80±16.69	63.03±13.57
Age (years)			
< 40	04 (5.4%)	02 (7.7%)	06
41 – 60	25 (33.8%)	10 (38.5%)	35
61 – 80	42 (56.8%)	10 (38.5%)	52
>80	03 (4.1%)	04 (15.4%)	07
History of head injury			
Yes	37 (50%)	12 (46.15%)	49
No	37 (50%)	14 (53.85%)	51
Underlying medical condition			
Hypertension	35 (47.29%)	23 (88.46%)	58
Diabetes mellitus	21 (28.38%)	17 (65.38%)	38
Stroke	09 (12.16%)	10 (38.46%)	19
Antiplatelet therapy	09 (12.16%)	10 (38.46%)	19
Anticoagulant therapy	05 (6.76%)	03 (11.53%)	08
ESRD with hemodialysis	02 (2.70%)	02 (7.69%)	04
Alcoholism	11 (14.86%)	02 (7.69%)	13
Mean GCS at admission	11.72±2.44	12.82±2.32	12.14±2.38

Table 2. Neuro-image findings of study participants at admission

Neuro-image findings	Numbers (%) / Mean±SD
Midline shift	12 (12%)
Mass effect	89 (89%)
Presence of layering	22 (22%)
Multiplicity of hematoma cavities	21 (21%)
Thickness of hematoma (mm)	32.09± 11.72
Density of hematoma (HU)	34.82 ± 10.38
Mean total hematoma volume in cm^3	178.8 ± 71.4

Neuro-image findings shows midline shift (12%), mass effect (89%), presence of layering (22%) and multiplicity of hematoma cavities (21%) among patients of bilateral CSDH. Mean thickness of hematoma was 32.09± 11.72 mm, mean density of hematoma was 34.82 ± 10.38 HU and mean total hematoma volume was 178.8 ± 71.4 cm3 among patients. (Table 2).

All patients of bilateral CSDH were treated by Biparietal burrhole with subgaleal drain placement. Mean duration of hospital stay was 18.12±8.34 days. At the time of discharge, 81% patient shows clinical improvement, 09% had no change in condition while 06% shows clinical deterioration and 04% patients die during treatment. During follow up, 4% of patients shows recurrence of SDH.

Table 3. Treatment and outcome of study participants

Variables	Numbers (%)
Treatment	
Surgical	100 (100%)
Conservative	00 (0%)
Outcome (at discharge)	
Improved	81 (81%)
No change	09 (9%)
Worsened	06 (06%)
Death	04 (4%)
Mean hospital stay (day)	18.12±8.34
Recurrence during follow up	04 (4%)

Table 4. Association of treatment outcome with Socio-demographic variables

Variables	Improved (n=81)	Others (no change, worsen and death) (n=19)	Total (n=100)	P value *
Age (years)				**0.013**
< 40	06 (100%)	00 (0%)	06	
41 – 60	31 (88.57%)	04 (11.43%)	35	
61 – 80	42 (80.76%)	10 (19.24%)	52	

>80	02 (28.57%)	05 (71.42%)	07	
Gender				**0.53**
Male	61 (82.43%)	13 (17.57%)	74	
Female	20 (76.92%)	06 (23.08%)	26	
Antiplatelet therapy				
Yes	12 (63.16%)	07 (36.84%)	19	**0.06**
No	69 (85.18%)	12 (14.52%)	81	
Anticoagulant therapy				
Yes	05 (62.5%)	03 (37.5%)	08	**0.35**
No	76 (82.6%)	16 (17.4%)	92	
Presence of layering				
Yes	16 (72.73%)	06 (27.27%)	22	**0.26**
No	65 (83.33%)	13 (16.67%)	78	
Multiplicity of hematoma cavities				
Yes	14 (66.67%)	07 (33.33%)	21	**0.059**
No	67 (84.81%)	12 (15.19%)	79	
Thickness of hematoma (mm)	31.6±10.56	34.16±11.88	32.09±11.72	**0.35**
Density of hematoma	34.61±10.20	35.66±10.76	34.82 ± 10.38	**0.69**
Mean total hematoma volume in cm^3	174.28±68.2	196.6±72.22	178.8 ± 71.4	**0.20**

*Chi square and student t test were used as test of significance.

For analysis purpose, outcome of patients was categorized into improved and others (no change, worsen and death). Statistically significant (p=0.013) association was observed with age as outcome is favourable with younger age. No association was found between gender(p=0.53), antiplatelet therapy(p=0.06), anticoagulant therapy (p=0.35), presence of layering (p=0.26) and treatment outcome of bilateral CSDH. Association of multiplicity of hematoma cavities (p=0.059), thickness of hematoma (p=0.35), density of hematoma (p=0.69) and mean total hematoma volume (p=0.20) was insignificant with outcome of CSDH.

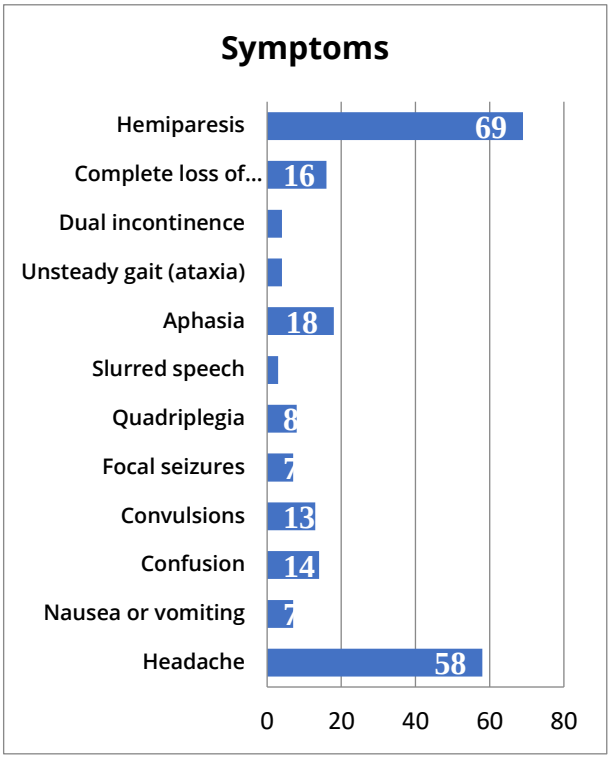

Figure 1. Symptoms of study participants at admission

Patients of bilateral CSDH were present with multiple symptoms at admission. Among them most common symptom was hemiparesis (69%) followed by headache (58%), aphasia (18%) and complete loss of consciousness (16%) excreta. (Figure 1).

Discussion

The increasing global incidence of bilateral CSDH because of an aging population has a great disease burden.[8,4] Clinically, patients often present with a history of gradually increasing altered level of consciousness and/or focal signs. A relatively simple neurosurgical treatment can improve functional outcome; however, high mortality is still observed in patients.[5]

In present study, a prospective study was planned on 100 radiologically confirm cases of bilateral CSDH. Among 100 patients, 74% were male and 26% were female. Age of patients varies from 35 years to 95 years with mean age of 63.03±13.57 years. Head injury was precede CSDH among 49% of patients. Patients were present with multiple symptoms at admission such as hemiparesis (69%), headache (58%), aphasia (18%), complete loss of consciousness (16%) excreta. Total 19% of patients were on antiplatelet therapy and 8% were on anticoagulant therapy at the time of admission. Yuji

Agawa et al[2] study 368 cases of bilateral CSDH. Average age at onset of disease was 74.2±12.8 years and 246 (66.8%) patients were male and 122 (33.2%) were female. Motor weakness (74.45%) was the most common clinical presentation followed by headache (19.56%). Forty-one patients (11.1%) had warfarin use, 67 (18.2%) patients had a history of malignancy, 46 (12.5%) had dementia and 16 (4.3%) had history of depression. Nina Christine et al[15] observed 291 patients of bilateral CSDH and find that out of 291 patients, 71.1% were male and 28.9% were female. Age is between 40 to 98 years, with a mean age of 73.0 years for males and 76.7 years for females. A history of head trauma was obtained in 53.3% patients. Approximately half of the study population (47.8%) received anticoagulant or antiplatelet therapy upon admission.

In this study, midline shift (12%), mass effect (89%), presence of layering (22%) and multiplicity of hematoma cavities (21%) was found in neuro-imaging. Mean thickness, density and mean total hematoma volume was 32.09± 11.72 mm, 34.82 ± 10.38 HU and 178.8 ± 71.4 cm^3 among patients. In neuro imaging of 25 patients of bilateral CSDH, Yu-Hua Huang et al[20] found midline shift (12%), mass effect (96%), presence of layering (20%) and multiplicity of hematoma cavities (20%) among patients of bilateral CSDH. Mean thickness of hematoma was 32.16 ±10.81 mm, mean density of hematoma was 35.80±11.30 HU.

In present study, management of all patients of bilateral CSDH were remain surgical. Mean duration of hospital stay was 18.12±8.34 days. At the time of discharge, clinical improvement was shown in 81% patient while 04% patients die during treatment. Treatment outcome was significantly associated with age but not with gender of patient. Nina Christine treat 264 (90.7%) patients surgically while 27 (9.3%) patients conservatively. Sakina Mehboob Rashid found improvement in 53.3%, worsening of condition among 6.6%, no change in 16.7% and deceased in 23.3% of patients. Similar to our study, Yuji Agawa observed poor clinical outcome among 03 (5.7%) patients and Yu-Hua Huang observed death among 01 (04%) of patients with bilateral CSDH. Olufemi Babatola et al[14] studied 73 patients with age range was 24 to 82 years. Among 73 patients of bilateral CSDH, in majority outcome was favourable (91.3%) in patients with a recurrence rate of 12.5% and mortality rate of around 6.3%. David Kitya et al[9] assess 205 patients of bilateral CSDH and found that 202 patients underwent surgical intervention with burr holes and drainage and 22.8% (46) were admitted to the ICU. Two patients had a recurrence, 5 suffered postoperative wound infection, and 18 died. GCS score on admission was a significant predictor of the discharge GCS score ($p = 0.004$), ICU admission ($p < 0.001$), and death ($p < 0.001$). Presenting symptoms differed by age. Hundred patients of bilateral CSDH was managed by Malaya Patel et al,[12] among them Burr hole drainage was carried out in 94 patients (94%). Primary craniotomy along with membrane excision was carried out in about 5 patients. Secondary craniotomy was performed in 1 patient. With all efforts, total five deaths were reported.

Conclusion

Bilateral CSDH are one of the most rewarding among neurosurgical procedures. Bilateral CSDH is common in elderly and prognosis is poor with increasing age however gender has no association with poor outcome. Head injury was preceding in bilateral CSDH among 49% of patients. Patients were present with multiple symptoms at admission. With timely diagnosis and management, improvement was observed in more than 80% of patients.

Conflicts of interest

The authors declare no conflict of interest.

Informed consent

Informed consent was obtained from all individual participants included in the study.

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