



Clinical Presentation Variants of Chronic Subdural Hematoma Cases

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Abstract

Background: Chronic subdural hematoma (CSDH) is a prevalent condition in neurosurgical practice, predominantly affecting the elderly. However, there is a paucity of data concerning the characteristics of CSDH patients within Middle Eastern populations including Yemen.

Aim of study: This study aims to systematically evaluate the clinical presentations of patients diagnosed with chronic subdural hematoma.

Methodology: A retrospective descriptive study was obtained from registry medical records of patients with CSDH in Al-Thawra Modern General Hospital (TMGH) over a period of six years from January, 2017 to November, 2022. The collected data encompassed demographic and clinical characteristics including clinical presentation, Glasgow Coma Scale (GCS) at admission, etiology, laterality of the hematoma, management approaches and patient outcomes.

Results: A total of 113 CSDH cases were analyzed, with 77.9% of the patients being male. The mean age was 61.8 years. Motor symptoms were the most common presenting feature, observed in 79.6% of cases, followed by symptoms of increased intracranial pressure (54.0%) and altered consciousness (46.0%). At admission, the majority of patients (54%) had a normal GCS score of 15, while 30.1% had GCS scores between 13 and 14. Left-sided hematomas were identified in

44.2% of patients, whereas 22.1% had bilateral presentations. The etiology remained unidentified in 45.1% of cases, with 30.1% having a history of a ground-level fall and 16.8% having a history of traffic accidents. Surgical intervention via burr hole was performed in 92.9% of patients, with a favorable outcome observed in the majority. The mortality rate was 3.5%.

Conclusion: Chronic subdural hematoma exhibits a wide spectrum of clinical manifestations, with motor symptoms being the most prevalent. The condition predominantly affects elderly males. Most patients were successfully managed through burr hole surgery, with favorable outcomes in the majority. This single-institution, retrospective study presents findings consistent with global data. However, larger, multi-center studies are necessary to better elucidate the epidemiological profile and variable clinical presentations of CSDH.

Keywords: *Clinical Presentation, Chronic Subdural Hematoma, Yemen*

Introduction

Chronic subdural hematoma (CSDH), defined as an intracranial, extra-axial accumulation of blood persisting for more than three weeks, is a frequently encountered form of intracranial hemorrhage [1-3]. The incidence of CSDH escalates with advancing age, rising from 3.4 per 100,000 in individuals younger than 65 years to a reported range of 8–58.1 per 100,000 in those aged 65 years and older [1-3]. This increased prevalence in the elderly population is primarily attributed to a higher risk of falls and the widespread use of antithrombotic medications [2]. Minor or blunt head trauma often precipitates the development of CSDH. In the elderly, cerebral atrophy leads to the stretching of bridging veins that traverse the potential subdural space to drain into the venous sinuses. These fragile veins are particularly susceptible to tearing after even minor trauma, resulting in slow bleeding into the subdural space. The subsequent osmotic expansion of this collection increases its volume, eventually causing a mass effect

and leading to clinical deterioration [4]. The clinical manifestations of CSDH are varied, ranging from mild symptoms, such as headaches and dizziness, to severe symptoms, including hemiplegia, coma, or death. These symptoms may differ according to the patient's age. Younger individuals typically present with signs of increased intracranial pressure, such as progressive headache, nausea, and vomiting [5,6]. Conversely, in older patients, particularly those over 65 years, cognitive and mental changes are more frequently observed [7]. A high index of suspicion is essential for the diagnosis of CSDH. It should be considered in any patient, regardless of trauma history, who presents with altered mental status, worsening of pre-existing neurological or psychological conditions, focal neurological deficits, or headaches with or without associated neurological deficits. Computed tomography (CT) of the brain should be strongly recommended in these cases to rule out CSDH [8]. Given the variability in clinical presentations and the frequent lack of initial suspicion, this study aims to explore the different presentations of CSDH

and their relationship to patient age. The incidence of CSDH is on the rise, likely reflecting the aging population, and is associated with a one-year mortality rate of up to 32% [9]. CSDH presents clinically with a range of non-specific symptoms, which are influenced by the patient's age and the presence of concurrent chronic diseases. Few studies have detailed the characteristics of CSDH in Middle Eastern populations, including Yemen.

Methodology

Study Setting and Design: This study was a retrospective descriptive analysis based on medical records from Al-Thawra Modern General Hospital (TMGH) in Sana'a, Yemen. The study focused on all cases diagnosed with CSDH over a period of nearly six years from January, 2017 to November, 2022.

Data Collection: The data were extracted from hospital medical records, including demographic details such as patient name, age, gender, admission date and file number. Clinical data related to CSDH were also collected, including Glasgow Coma Scale (GCS) at admission, presenting neurological symptoms, associated etiological factors (e.g., trauma, fall), specific hematoma characteristics like the side of hematoma within the cranium, management strategies and outcomes.

Inclusion Criteria and Exclusion

Criteria: The study included patients of any age and gender who were diagnosed with CSDH and admitted to TMGH in Sana'a, Yemen between January 2017 and November 2022. Cases with insufficient data

were excluded from the study. Additionally, patient with acute subdural hematoma, spinal subdural hematoma, brain contusion or epidural hematoma were also excluded.

Statistical Analysis: Data was analyzed by SPSS v25.0. Descriptive statistics were employed to describe participants' demographic characteristics. Continuous data were reported as mean $\pm$ SD for normally distributed variables, while categorical data were presented as frequencies and percentages. The associations between two qualitative variables were measured using proportion, and the difference of the proportions across subgroups were tested for significance using the Chi-square, with p-value < 0.05 considered statistically significant.

Ethical Considerations: Approval for the study was obtained from TMGH following the current ethical guidelines for retrospective studies.

Results

Patient characteristics

This study included a total of 113 file of patients with CSDH who were admitted to the hospital. 77.9% of them were males and 22.1% were females. The mean age was 61.8 years. The predominant age group were patients older than 60 years 60.2% in comparing to 23% of patients aged between 41-60 years, 11.5% were between 20-4years and only 5.3% were younger than 20 years, **Table 1.**

Table 1: Demographic and Clinical Characteristics of Study Sample.

	Variables	No.	%
Gender	Male	25	22.1
	Female	88	77.9
Age Group	< 20	6	5.3
	20-40	13	11.5
	41-60	26	23.0
	> 60	68	60.2
Consciousness Level	Confused	34	30.1
	Loss of consciousness	18	15.9
Motor Symptoms	Normal	61	54.0
	Right and left-sided hemiplegia	2	1.8
	Right and left-sided hemiparesis	8	7.1
	Left -sided hemiplegia	2	1.8
	Left-sided hemiparesis	32	28.3
	Right-sided hemiplegia	3	2.7
	Right-sided hemiparesis	43	38.1
	No motor symptoms	23	20.4
	Yes	61	54
	No	52	46
Raised ICP symptoms	Yes	59	52.2
	No	54	47.8
Headache	Yes	4	4
	No	108	96
Convulsion	Yes	3	2.7
	No	110	97.3
Ataxia	Stool	2	1.8
	Urine	9	8
Sphincter Incontinence	Both	6	5.3
	Normal	96	85
Sensory symptoms	Anesthesia	1	0.9
	Numbness	4	3.5
	Normal	108	95.6
State of Speech	Slurred	23	20.4
	Aphasia	6	5.3
	Normal	84	74.3
Other Symptoms	Dizziness	5	4.4
	Easy fatigability	1	0.9
	Epistaxis	1	0.9
	Hallucinations	2	1.8
	No other symptoms	104	92.0
Total		113	100

*No.= Number, %= Percent

Frequency of presenting symptoms:

The majority of the patients 54% had normal level of consciousness, 30.1% were

confused, and 15.9% had a loss of consciousness. **Table 1.**

In term of motor symptoms, 38.1% patients had right-sided hemiparesis, 28.3% had left-sided hemiparesis, 7.1% had both right and left-sided hemiparesis, in contrast to 2.7% patients who had right-sided hemiplegia, 1.8% had left-sided hemiplegia, 1.8% had both right and left-sided hemiplegia. About 20.4% patients had no motor symptoms.

More than half of patients 54% showed spectrum of raised intracranial pressure (ICP) symptoms. Headache was the most frequent symptom 52.2% either presented alone or in association with other symptoms. On the other hand, only 4.4% of patients were complaining of convulsions either alone or along with other symptoms, while most patients 95.6% were free from convulsions. Among all cases, only 2.7% developed ataxia. The majority of patients 85% had normal sphincteric control, in contrast to 8% who had urinary incontinence, 1.8% had stool incontinence, and 5.3% cases had incontinence for both stool and urine. **Table 1.**

The sensory system was intact in the majority of patients 95.6%, with only 3.5% experiencing unilateral arm numbness, and one patient presented with complete loss of sensation on the right side of the body. Speech function was preserved in 74.3% of patients, while 20.4% had slurred speech, and 5.3% were aphasic. Additionally, some patients reported dizziness 4.4%, hallucinations 1.8%, epistaxis 0.9%, or easy fatigability 0.9%. Further details can be found in .

Common Clinical Presentations:

Motor symptoms were the most common presenting symptoms. It affected approximately 79.6% of cases in the form of paresis or paralysis. 54% of patients were complaining from raised ICP symptoms. Headache was the most frequent symptom 52.2%, while only 4.4% of patients were complaining of convulsions. 46.0% of patients reported alteration in consciousness level in contrast to 15.9% who had complete

loss of consciousness. Frequencies of speech abnormalities, sphincter incontinence, other symptoms and sensory abnormalities were as following 25.7%, 15.0%, 10.0% and 4.4% respectively. The least documented symptom in our study was gait disturbance with 2.7% of patients were suffering from ataxia. **Figure 1** shows the various presenting sympto

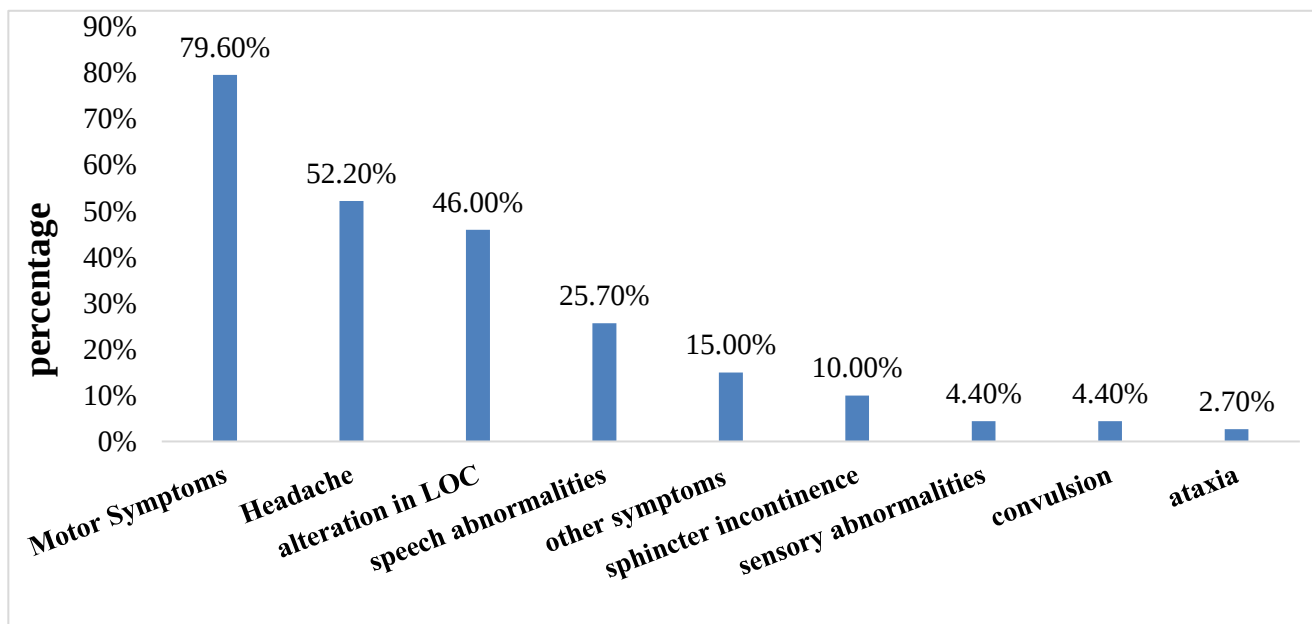


Figure 1: Frequencies of Clinical Presentation in Patients with Chronic Subdural Hematoma

Etiologies

Approximately half of the cases had identifiable etiological factors contributing to the development of CSDH. These included minor head injuries due to falls in 30.1% of patients, traffic accidents in 16.8%, and cranial surgeries in 1.8%. Additionally, 6.2% of patients had a recurrence of CSDH post-operation. However, in 45.1% of cases, no specific cause could be identified.

Figure 2.

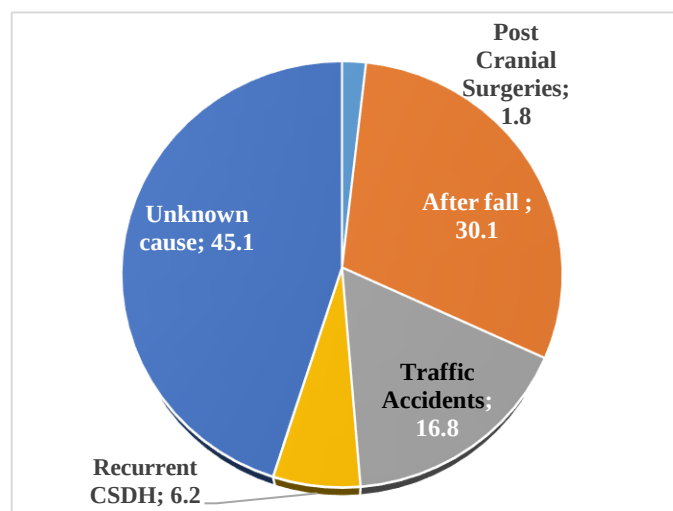


Figure 2: Frequencies of Etiological Factors Associated with development of Chronic Subdural Hematoma

Table 2: Distribution of Study Sample by GCS at Admission

GCS at Admission	No.	%
< 9	4	3.5
12-9	14	12.4
14-13	34	30.1
15	61	54.0
Total	113	100.0

No. = Number, % = Percent

Glasgow Coma Scale (GCS) at Admission

Table 2 shows the Glasgow coma scale (GCS) at the time of admission, which was distributed as follows: 15/15 in 54.0%, 14-13/15 in 30.1%, 12-9/15 in 12.4%, and less than 9/15 in 3.5%.

Hematoma Side:

Figure 3 shows the distribution of CSDH according to the side of the hematoma in cranial cavity, 44.2% of CSDH localized on the left side of the cranial cavity. In comparison to 33.6% had CSDH on the right side of cranial cavity, and 22.1% exhibited bilateral hematomas.

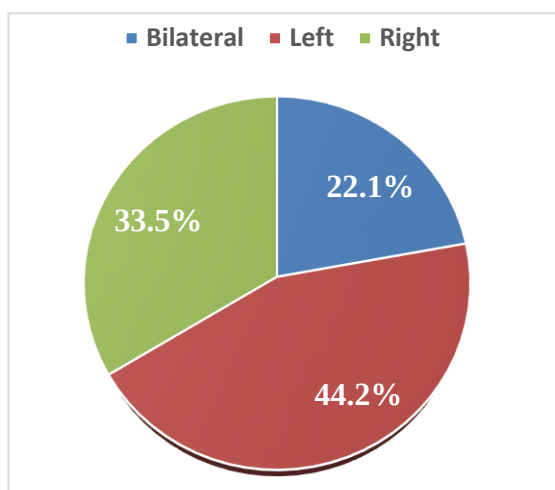


Figure 3: Distribution of Sample by Laterality of The Hematoma within the cranial cavity.

Management Strategies and Outcome

As depicted in **Figure 4**, the predominant management strategy for CSDH was burr hole surgery performed in 92.9% of cases.

Craniotomy was utilized in 5.3%, while 1.8% were managed conservatively. The prognosis for the majority of patients was favorable, with 96.5% showing positive outcomes, whereas only 3.5% resulted in mortality, as shown in **Figure 5**.

Relationship between Clinical

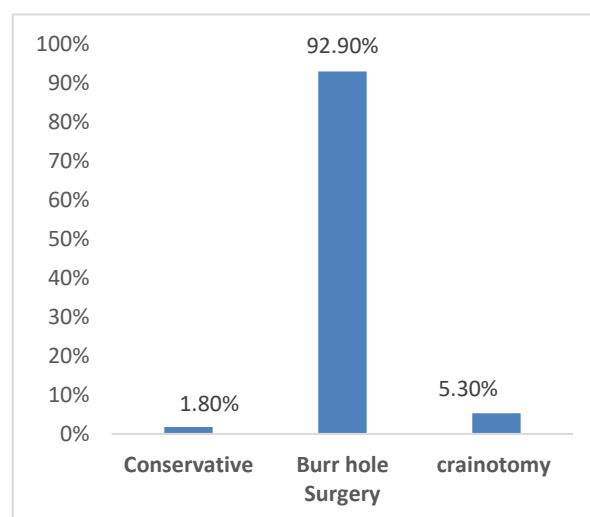


Figure 4: Management Strategies of Chronic Subdural Hematoma Cases.

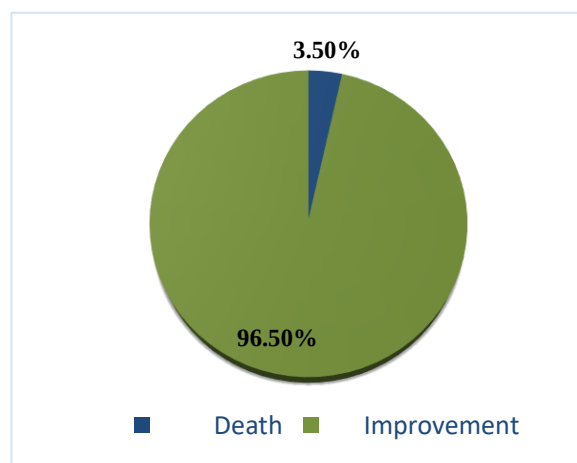


Figure 5: Distribution of Study Sample by Outcomes.

Presentation and Variables

Table 3 reveals a statistically significant association between motor symptoms and age groups within the study sample (p-value = 0.009). Additionally, a statistically significant relationship was observed between convulsions and age groups (p-value = 0.006). However, no statistically significant associations were found

between age groups and other variables, such as consciousness level, gait disturbance, speech, sphincter incontinence, headache, sensory symptoms, or other symptoms (p-values > 0.05).

Table 3 provides further details on the relationship between these variables and age groups.

Table 3: Relationship between Clinical Presentation and Age Groups, Outcome

Clinical Presentation			Age groups (Years)				Total	P. Value	Outcome		Total	P.Value
			20<	20-40	41-60	60>			Death	Improve		
Consciousness level	Confused	No.	2	4	5	23	34	0.329	1	33	34	0.003
		%	1.8	3.5	4.4	20.4	30.1		0.9	29.2	30.1	
	Loss of consciousness	No.	0	2	8	8	18		3	15	18	
		%	0.0	1.8	7.1	7.1	15.9		2.7	13.3	15.9	
	Normal	No.	4	7	13	37	61		0	61	61	
		%	3.5	6.2	11.5	32.7	54		0	54	54	
Motor symptom	Both limbs paralysis	No.	0	0	1	1	2	0.009	0	2	2	0.479
		%	0	0	0.9	0.9	1.8		0	1.8	1.8	
	Both limbs weakness	No.	0	1	4	3	8		1	7	8	
		%	0	0.9	3.5	2.7	7.1		0.9	6.2	7.1	
	Left limbs paralysis	No.	0	0	1	1	2		0	2	2	
		%	0	0	0.9	0.9	1.8		0	1.8	1.8	
	Left limbs weakness	No.	0	1	5	26	32		1	31	32	
		%	0	0.9	4.4	23.0	28.3		0.9	27.4	28.3	
	Right limbs paralysis	No.	0	1	1	1	3		0	3	3	
		%	0	0.9	0.9	0.9	2.7		0	2.7	2.7	
	Right limbs weakness	No.	1	4	9	29	43		0	43	43	
		%	0.9	3.5	8.0	25.	38.1		0	38.1	38.1	
	No Motor Symptoms	No.	5	6	5	7	23		2	21	23	
		%	4.4	5.3	4.4	6.2	20.4		1.8	18.6	20.4	
Gait disturbance	No	No.	5	13	25	67	110	0.143	4	106	110	0.737
		%	4.4	11.5	22.1	59.3	97.3		3.5	93.8	97.3	
	Yes	No.	1	0	1	1	3		0	3	3	
		%	0.9	0.	0.9	0.9	2.7		0	2.7	2.7	
Speech	Aphasia	No.	1	0	1	4	6	0.619	0	6	6	0.876
		%	0.9	0.	0.9	3.5	5.3		0	5.3	5.3	
	Slurred	No.	0	2	5	16	23		1	22	23	
		%	0.0	1.8	4.4	14.2	20.4		0.9	19.5	20.4	
	Normal	No.	5	11	20	48	84		3	81	84	
		%	4.4	9.7	17.7	42.5	74.3		2.7	71.7	74.3	
Sphincter Incontinence	Stool	No.	0	0	0	2	2	0.507	0	2	2	0.323
		%	0.0	0	0	1.8	1.8		0	1.8	1.8	
	Urine	No.	0	0	1	8	9		0	9	9	
		%	0	0.	0.9	7.1	8.0		0	8	8	
	Both	No.	0	0	3	3	6		1	5	6	
		%	0	0.	2.7	2.7	5.3		0.9	4.4	5.3	
	Normal	No.	6	13	22	55	96		3	93	96	
		%	5.3	11.5	19.5	48.7	85.0		2.7	82.3	85	
Headache	Yes	No.	5	10	14	30	59	0.062	2	57	57	0.923
		%	4.4	8.8	12.4	26.5	52.2		1.8	50.4	52.2	
	No	No.	1	3	12	38	54		2	52	54	
		%	0.9	2.7	10.6	33.6	47.8		1.8	46	47.8	
Convulsion	Yes	No.	0	3	0	2	5	0.006	0	5	5	0.661
		%	0	2.7	0	1.8	4.4		0	4.4	4.4	
	No	No.	6	10	26	66	108		4	104	108	
		%	5.3	8.8	23.0	58.4	95.6		3.5	92	95.6	
Sensory symptoms	Anesthesia	No.	0	0	0	1	1	0.952	0	1	1	0.908
		%	0	0	0	0.9	0.9		0	0.9	0.9	
	Numbness	No.	0	1	1	2	4		0	4	4	
		%	0	0.9	0.9	1.8	3.5		0	3.5	3.5	
	normal	No.	6	12	25	65	108		4	104	108	
		%	5.3	10.6	22.1	57.5	95.6		3.7	96.3	100	

No. = Number, % = Percent

Table 4 demonstrates a statistically significant correlation between GCS at admission and the management approach (p-value = 0.035). Moreover, it highlights a significant relationship between GCS at

admission and patient outcomes (p-value < 0.001). **Table 5** further reveals a statistically significant association between the chosen management strategy and patient outcomes (p-value < 0.001).

Table 4: Relationship between Management, Outcomes and GCS at Admission.

Variables			Management			Total	P.Value	Outcomes		Total	P.Value
			Conservative	Surgical burr hole	Surgical craniotomy			Death	Improve		
GCS at admission	< 9	N	1	3	0	4	0.035	2	2	4	0.001
		%	0.9	2.7	0.0	3.5		1.8	1.8	3.5	
	12-9	N	0	13	1	14		1	13	14	
		%	0.0	11.5	0.9	12.4		0.9	11.5	12.4	
	14-13	N	0	32	2	34		1	33	34	
		%	0	28.3	1.8	30.1		0.9	29.2	30.1	
	15	N	1	57	3	61		0	61	61	
		%	0.9	50.4	2.7	54.0		0	54	54	

No. = Number, % = Percent

Table 5: Relationship between Outcomes and Management.

Variables			Outcomes		Total	P.Value
			Death	Improve		
Management	Conservative Management	N	1	1	2	0.001
		%	0.9	0.9	1.8	
	Burr hole Surgery	N	3	102	105	
		%	2.7	90.3	92.9	
	craniotomy	N	0	6	6	
		%	0.0	5.3	5.3	
	Total	N	4	109	113	
		%	3.5	96.5	100.0	

No. = Number, % = Percent

Discussion

This retrospective study analyzed 113 medical records of patients diagnosed with chronic subdural hematoma (CSDH) to

investigate the variations in clinical presentation among this study. The sociodemographic data revealed that CSDH predominantly affects older males, with 60.2% of the patients being over 60 years old, and a mean age of 61.8 years. These findings align with a similar study

conducted in Uganda, where the mean age was reported as 60.2 years [10]. The gender distribution in our study showed that 77.9% of the cases were male and 22.1% female, a pattern consistent with research from Kosovo, which reported 77.3% male predominance [11]. Motor symptoms, manifesting as either weakness or paralysis, were the most common presenting features, observed in 79.6% of the patients. This was followed by symptoms of increased intracranial pressure (ICP) in 54.0% of cases,

headaches in 52.2%, convulsions in 4.4%, altered consciousness in 46.0%, complete loss of consciousness in 15.9%, speech abnormalities in 25.7%, sphincter incontinence in 15%, sensory impairments in 4.4%, and gait disturbances in 2.7%. These findings are in concordance with study conducted at CHU Sylvanus Olympio (Lome), where motor weakness was the most frequent clinical presentation (56.1%), followed by headache (51.5%) and confusion (34.8%) [12].

Similarly, another study in Uganda reported headaches as the most common symptom 89.6%, followed by confusion 71.7% and limb weakness 70%. The Lagos University Teaching Hospital study also identified headache 89% as the most prevalent symptom, followed by motor deficits 63%, fluctuating consciousness levels 54.2%, inappropriate speech 16.6%, seizures 10.4% and incontinence 6.3% [13].

In this study, head trauma was identified as the primary etiological factor in 46.9% of patients, with falls accounting for 30.1% and road traffic accidents for 16.8% of cases. Recurrence of CSDH was noted in 6.2% of patients, and 1.8% reported CSDH following cranial surgery. However, in 45.1% of cases, no specific cause could be identified. This is consistent with another study, which reported a definite history of head injury in 57% of patients and a past neurosurgical history in 8%, with 29% of cases having no identifiable cause [14]. Regarding the laterality of the hematoma, our study found that 77.9% of patients had unilateral hematomas, with 44.2% on the left side, 33.6% on the right side, and 22.1% exhibiting bilateral hematomas.

These findings are in line with similar studies that reported CSDH on the left side in 52% of cases, on the right in 30.4%, and bilateral in 17.6% [14]. Another study reported right-sided hematomas in 42.3% of cases, left-sided in 36.3%, and bilateral in 21.4% [10].

The majority of patients (92.9%) in this study were managed surgically with burr hole drainage, followed by craniotomy in 5.3% and conservative management in 1.8% of cases. This treatment pattern is consistent with other studies, such as one reporting burr hole surgery in 95.3% of patients and craniotomy in 4.7% [15].

Statistical analysis revealed significant associations between motor symptoms and age groups (p -value = 0.009), and between convulsions and age groups (p -value = 0.006). There was also a significant relationship between convulsions and management strategies (p -value = 0.006), and between GCS at admission and both management strategies (p -value = 0.035) and outcomes (p -value = 0.001). These findings are in agreement with a South African study that found a significant relationship between GCS at presentation and patient outcomes (p -value = 0.002) [16]. Similarly, a 2017 study in Korea demonstrated a strong association between initial GCS scores and patient prognosis ($p < 0.001$) [17].

This study has several limitations. The sample size was restricted to 113 patients, which may limit the generalizability of the findings and possibly either overestimate or underestimate the true frequencies of clinical presentations, injury mechanisms, and outcomes. Additionally, the study was

conducted at a single referral hospital in Sana'a, Yemen, limiting the applicability of the results to more urbanized or rural populations. Furthermore, the retrospective nature of the study, relying on patient records, led to missing data in some cases.

Conclusion

Chronic subdural hematoma (CSDH) typically presents with a range of symptoms, predominantly motor symptoms, and predominantly affects elderly males. The condition predominantly affects elderly males. Most patients were successfully managed through burr hole surgery, with favorable outcomes in the majority. This single-institution retrospective study yielded results comparable to those observed in other global studies. However, larger, multicenter studies are necessary to provide a more precise epidemiological characterization and to identify the diverse clinical presentations of CSDH. Additionally, prospective studies are recommended to assess long-term outcomes and to develop health education programs, conferences, and training for healthcare professionals. Improving the quality and completeness of medical records is also crucial.

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