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Spectrum of Chronic Subdural Haematoma in Elderly Patients Managed at a Single Neurosurgical Unit

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ABSTRACT

Introduction: Chronic subdural haematoma (CSDH) refers to the accumulation of liquefied blood between the dura mater and arachnoid, presenting as an encapsulated collection. Clinical manifestations of CSDH vary.

Objectives: This study aims to investigate the spectrum, demographic patterns, risk factors, clinical presentation, imaging characteristics, surgical management, and outcomes of surgical treatment for CSDH.

Study Methodology: A retrospective analysis was conducted on elderly patients diagnosed with CSDH who underwent surgical treatment between January 2016 and September 2022.

Results: The study sample comprised 135 elderly patients, with 81 (60%) males and 54 (40%) females, resulting in a male-to-female ratio of 1.5:1. The age range was 65 to 90 years, with an average age of 72.6 years.

Non-traumatic CSDH was observed in 58% of patients, with an average symptom duration of 14.4 days. Headache was reported by 134 patients (99%), while 102 (76%) had hypertension and focal neurological deficits. Altered consciousness was present in 121 patients (90%), and motor abnormalities were observed in 76% of patients.

The location of CSDH was right-sided in 43% of cases, left-sided in 30%, and bilateral in 27%. Burrhole craniostomy was performed in all patients with the use of a closed drainage system. The complication rate was 7%, and recurrence and mortality rates were 4% each.

Conclusion: Altered consciousness was the most common clinical manifestation, and headache was the predominant symptom. Hypertension was the most frequently associated co-morbidity. Burrhole craniostomy with a closed drainage system was the preferred surgical approach, demonstrating high efficacy and a low complication rate.

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Objectives

To determine the spectrum, demographic patterns, risk factors, clinical presentation, imaging patterns and outcomes of surgical management of chronic subdural haematoma (CSDH).

Introduction

CSDH refers to a collection of mostly liquefied blood that forms between the dura mater and arachnoid, enclosed within a capsule [1,2]. It typically appears hypodense compared to brain tissue on computed tomography (CT) scans, and is considered chronic if it has been present for more than three weeks after an injury or event [1,3]. The reported annual incidence of CSDH ranges from 0.001% to 0.007% [1,3,4]. While it can sometimes develop from an acute subdural hematoma, it more commonly arises from a subdural hygroma [5,6]. The elderly population is particularly susceptible due to cerebral atrophy and increased vulnerability of blood vessels [3,7,8]. CSDH is more frequently observed in males than females [7-9].

Although trauma to the head, even minor, is a known cause of CSDH, an actual history of trauma is only found in around 50-77% of cases [9-11]. Other risk factors include the use of anticoagulants, clotting disorders, hypertension, alcohol abuse, CSF shunting, and arachnoid cysts [12]. The clinical presentation of CSDH can vary and may include behavioural changes, altered consciousness, headaches, hemiparesis, cognitive disturbances, seizures, and loss of bowel and/or bladder control [3,9]. CT scans of the brain are crucial for diagnosis [13].

CSDH is a common condition that can lead to significant morbidity and mortality [14]. However, it can be effectively treated with relatively simple surgical interventions, resulting in rapid clinical improvement [13,14]. The preferred surgical methods include twist drill or burr hole craniostomy, and in some cases, a craniotomy may be performed [15,16]. After the evacuation of the hematoma, a subdural drain is often inserted, with or without irrigation, to reduce the chances of recurrence and mortality [11,17]. Non-operative management has also been attempted, but recurrence rates vary [18]. In our neurosurgical unit, we primarily perform burr hole craniostomy with closed-system drainage as the preferred surgical approach. The aim of our article is to present the evaluation of the range, demographic trends, contributing factors, clinical symptoms, diagnostic imaging results, surgical interventions, and treatment outcomes of CSDH at our facility, spanning a duration of seven years.

Study Methodology

The data for our study was collected retrospectively from patient records on Meditech®, while neuro-imaging data was obtained from Sorian Plaza and Jivex Teleradiology systems. These records pertained to patients who were admitted to IALCH between January 2016 and December 2022, diagnosed with CSDH and underwent a neurosurgical procedure.

Specifically, our study focused on a group of 135 patients aged 65 years or older, who were symptomatic and exhibited CSDH on neuro-radiology imaging and received treatment at IALCH during the specified time period. The diagnosis was made by inspecting CT scans and CSDH was classified as mixed density containing some acute blood isodense to the brain, or hypodense to the brain.

The collected data included age, gender, co-morbidities, clinical characteristics, pre-existing medical conditions and chronic medication, Glasgow Coma Scale (GCS), neurological deficits, neuro-radiology findings, surgical management and follow up. Admission laboratory values, surgical management, length of hospital stay, surgical complications, clinical outcome as measured by Glasgow outcome scale (GOS), and mortality rate and any complications of treatment collated were analysed.

In all the cases reviewed, operative management was due to the presence of significant symptoms associated with the diagnosed CSDH. All procedures were performed under general anesthesia. Burr hole drainage was performed for all cases, with the specific approach varying based on the nature of the CSDH. For unilateral CSDH one or two burr holes were performed on the same side, while bilateral CSDH required one burr hole on each side.

Durotomy was opened in a cruciate incision and carefully evacuating the hematoma using normal saline irrigation in the subdural space. The catheter was connected to a closed-system drain was used for 48 hours. At the time of discharge from the hospital, the GOS was assessed to evaluate the patient's overall outcome. Ethical approval was obtained from the Biomedical Research Ethics Committee (BREC) of the University of KwaZulu-Natal.

Results

Our sample consisted of 135 patients, 81 males and 54 females (ratio 1.5:1), aged from 65 – 93 years, with an average of 72,6 years, figure 1.

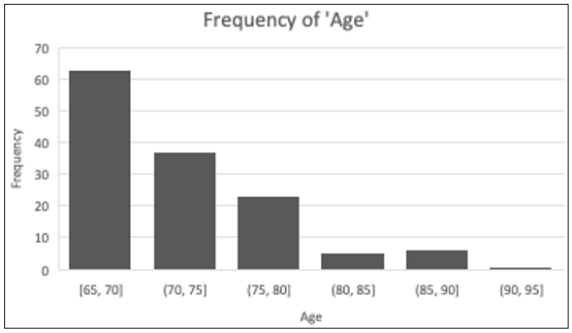

Figure 1: Age Frequency

Non-traumatic CSDH was observed in 58% of patients, with an average symptom duration of 14.4 days.

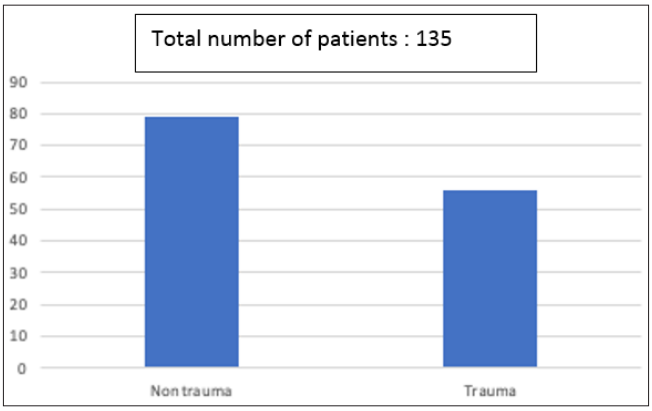

Figure 2: Aetiology

One hundred and thirty-four (99%) presented with a headache, 90% had altered consciousness, 76.2% had motor abnormalities, 34% with facial nerve palsy and 2.6% had seizures, table 1, while the most common pre-existing medical conditions were hypertension in 76%, followed by diabetes mellitus in 67,4%, and epilepsy in 10%, table 2.

Table 1: Presentation and Clinical Features

Presentation	Frequency	Percentage (%)
Headache	134	99,3%
Altered level of consciousness	121	89,6%
Hemiparesis	96	71,1%
Facial nerve palsy	46	34%
Seizures	17	12,6%
Aphasia	12	8,8%
Anisocoria	11	8.1%
Urinary and faecal incontinence	6	4.4%
Paraparesis	6	4,4%
Quadriparesis	1	0,7%

Three (2.2%) patients were alcoholics. One (0.7%) patient was on anti-coagulants, 3.7% on aspirin.

Table 2: Concomitant Disease/Contributing Factors

	Frequency	Percentage
Hypertension	102	75.5%
Diabetes mellitus	91	67,4%
Epilepsy	14	10.3%
Renal failure	7	5,2%
Dyslipidemia	6	4,4%
Aspirin	5	3.7%
Alcohol use	3	2,2%
Warfarin	1	0.7%

We found that the location of CSDH was right-sided in 43% of cases, left-sided in 30%, and bilateral in 27%. All patients underwent a CT scan of the brain to diagnose CSDH, figure 3. The midline deviation ranged from 9 – 15 mm with an average 11.4 mm. The size of the ranged from 11 – 28 mm, average 11.9 mm.

Figure 3: CT Scan of the Brain with a Right CSDH and Midline Shift

The Glasgow Coma Scale (GCS) scores at the time of admission varied from 3 to 15. The majority of the patients, 69.6% presented with a mild GCS, as shown in table 3.

Table 3: Comparison between GCS at Presentation and GOS at Discharge

Age	GCS	Total	%	GOS	1	2	3	4	5
Mild	13-15	94	69.6%		5	6	3	6	115
Moderate	9-12	28	20.7%						
Severe	3-8	13	9.6%		3.7%	4.4%.	2.2%.	4.4%	85.3%
GOS: 1 = Death, 2 = Persistent vegetative state, 3 = Severe disability, 4 = Moderate disability, 5= full recovery GCS: GCS 13 -15 (mild), GCS 9-12 (moderate), GCS 3 – 8 (severe)									

As for prognosis, in our study majority of patients; 49.6% presented with Markwalder grade 2, as shown in figure 4.

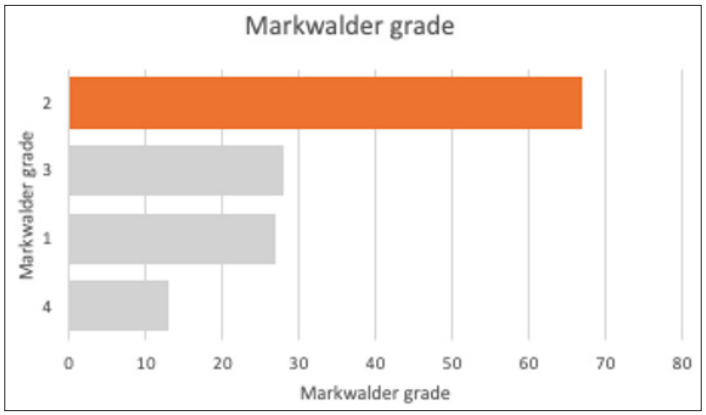

Figure 4: Markwalder Grading

The treatment of choice was burr hole craniotomy; 61% had 2 burr holes and 39% had one, with the use of a closed drainage system. Warm saline irrigation was done in 62.2%. ICU admission was required in 8.1% of patients. The complication rate was 7%, and recurrence and mortality rates were 4% each.

Table 4: Modified Rankin Scale

Modified Rankin scale	Modified Rankin scale	Percentage %
0	71	52.6%
2	43	32%
4	6	4.4%
5	6	4.4%
6	5	3.7%
3	3	2.2%
1	1	0.7%
Grand Total	135	

Seventy-one patients (52.6%), had a Rankin score of 0, with no disability or symptoms and 5 (3.7%) patients had a Rankin score of 6, indicating death as shown in table 4. At discharge the Glascow Outcome Scale (GCOS) was 5 in 85.6% of patients as shown in table 3 and the duration of hospital stay averaged 6.03 days.

Discussion

The research study included a sample of 135 elderly patients, consisting of 81 males and 54 females, with an average age of 72.6±6.13 years. Gelabert-González et al, age range of patients was 12–100 years, with mean age 72.7±11.4 years, while in Baechli's work, 69% of the cases were ≥ 65 years old [8,19]. The male preponderance of 60% observed in our study is consistent with findings of 62.8– 82.5% in other studies [19].

Non-traumatic chronic subdural hematoma (CSDH) was observed in 58% of the patients, with an average symptom duration of 14.4 days. The most common symptoms reported by the patients were headaches (99%), altered consciousness (90%), motor abnormalities (76.2%), facial nerve palsy (34%), and seizures (12.6%). Fluctuating neurological symptoms were uncommon and the symptoms started insidiously and progress gradually.

In other studies, the most common presentation in elderly (50%-70%) is altered mental state in varying degrees of confusion, drowsiness, or coma [20,21]. Hemiparesis was usually contralateral in our study and consistent with most studies. Luxon et al, series, found hemiparesis in 58% of cases and the weakness of limbs was mild but drowsiness was out of proportion to the degree of neurological deficit [22].

In our study hypertension (76%), diabetes mellitus (67.4%), and epilepsy (10%) were the most prevalent pre-existing medical conditions among the patients. The preponderance of hypertension in our study may be related to age. Epilepsy is a rare presentation and is reported in up to 6% of cases as an initial symptom. The incidence of headache varies in different studies, ranging from 14 to 50%. In patients with known epilepsy increasing frequency of seizures has been noted with the development of CSDH [21,22].

The Glasgow Coma Scale (GCS) scores at the time of admission varied from 3 to 15, with the majority of patients (69.6%) presenting with a mild GCS. The location of CSDH was found to be right-sided in 43% of cases, left-sided in 30%, and bilateral in 27%. CT scans were performed on all patients for diagnosis, revealing midline deviation ranging from 9-15 mm with an average of 11.4 mm. The size of the hematoma ranged from 11-28 mm, with an average of 11.9 mm.

Burr hole craniostomy was the treatment of choice in all of the CSDHs with 61% of patients undergoing 2 burr holes and 39% undergoing one burr hole. If urgent burr holes are indicated, platelet count was taken and measures to improve function undertaken in patients with coagulopathy and/or thrombocytopaenia.

Burr holes were made at a site of maximum haematoma thickness. Surgeons differed in their choice regarding usage of one or two burr holes. Our study indicated that there was no statistically significant distinction in outcomes when comparing the use of one or two burr holes for the treatment of CSDHs.

The membranes when present were incised and often subdural fluid drained under considerable pressure. Warm saline irrigation was performed in 62.2% of cases and no statistical difference in outcome if irrigation was no performed. Closed drainage system was used in all patients and the catheter is left for 24-48 hours to allow any residual haemorrhage to be removed using gravity drainage and gentle suction.

The complication rate was 7% and is consistent with rates of 4 to 19.6% reported in other series, with recurrence and mortality rates both at 3.7% [23]. Lucas et al, in their series, a recurrence rate of 3.6% compares favourably with the balance of the literature, consistent with our findings, however the in-hospital mortality rate was significantly lower than that of 16.7% [23]. The recurrence rate for CSDH remains low regardless of the number of burr holes used. One burr hole craniostomy with closed drainage could be sufficient to evacuate CSDH with lower or similar recurrence rate, as compared to two burr hole groups [24].

In our series 11 (8.1%) of patients required ICU admission due to low GCS between 3 to 8 and 5 (3.7%) died in ICU. Van Havenbergh et al, identified the neurological state of the patient as the most important prognostic factor in CSDH. In terms of severity of CSDHs, the majority of patients 94 (69.6%) presented with Markwalder gradings 2 (49.2%), 1 (20%) and 3 (20.7%); and 13 (9%) with grade 4 indicating poor prognosis. The Glasgow Outcome Scale (GOS) at discharge showed that 85.6% of patients achieved a score of 5, indicating good recovery, 15 (11%) poor outcome and mortality rate of 3.7%. A correlation exists between a higher Markwalder grade and a favourable outcome.

The Modified Rankin Scale (MRs) was used to assess disability, with 71 (52.6%) of patients having a score of 0 (no disability), 43 (32%) mild disability and 3.7% having a score of 6 (indicating death), table 4. Overall 86,3% improved and were discharged home. The average duration of hospital stay was 6.03 days [25, 26].

Conclusion

In elderly patients presenting with CSDH in our centre, the leading clinical feature on presentation is headache. Trauma was not the predominant cause and in majority of cases it was an indicator

of underlying chronic medical conditions. Burr hole craniostomy with a closed-drainage system is a treatment of choice with favourable outcome. According to our study, there was a significant association between a low Glasgow Coma Scale (GCS) score at presentation, ICU admission and a poor outcome.

Conflict

No conflict of interest

References

1. Adhiyaman V, Asghar M, Ganeshram KN, Bhowmick BK (2002) Chronic subdural haematoma in the elderly. Postgrad Med J 78: 71-75.
2. Asghar M, Adhiyaman V, Greenway MW, Bhowmick BK, Bates A (2002) Chronic subdural haematoma in the elderly - a North Wales experience. J R Soc Med 95: 290-292.
3. Ramachandran R, Hegde T (2007) Chronic subdural hematomas causes of morbidity and mortality. Surg Neurol 67: 367-372.
4. Gelabert González M, Iglesias Pais M, García Allut A, Martínez Rumbo R (2005) Chronic subdural haematoma: Surgical treatment and outcome in 1000 cases. Clin Neurol Neurosurg 107: 223-229.
5. Lee KS, Bae WK, Doh JW, Bae HG, Yun IG (1998) Origin of chronic subdural haematoma and relation to traumatic subdural lesions. Brain Inj 12: 901-910.
6. Lee KS (2004) Natural history of chronic subdural haematoma. Brain Inj 18: 351-358.
7. Liliang PC, Tsai YD, Liang CL, Lee TC, Chen HJ (2002) Chronic subdural haematoma in young and extremely aged adults: A comparative study of two age groups. Injury 33: 345- 348.
8. Baechli H, Nordmann A, Bucher HC, Gratzl O (2004) Demographics and prevalent risk factors of chronic subdural haematoma: Results of a large single-center cohort study. Neurosurgical Review 27: 263-266.
9. Kageyama H, Toyooka T, Tsuzuki N, Oka K (2013) Nonsurgical treatment of chronic subdural hematoma with tranexamic acid. J Neurosurg 119: 332-337.
10. Foelholm R, Waltimo O (1975) Epidemiology of chronic subdural haematoma. Acta Neurochir 32: 247-250.
11. Kuroki T, Katsume M, Harada N, Yamazaki T, Aoki K, et al. (2001) Strict closed-system drainage for treating chronic subdural haematoma. Acta Neurochir 143: 1041-1044.
12. Islamian AP, Polemikos M, Krauss JK (1993) Chronic subdural haematoma secondary to Hamilton MG, Frizzell JB, Tranmer BI, Tator CH, Horwitz NH. Chronic subdural hematoma: The role for craniotomy re-evaluated. Neurosurgery 33: 67-72.
13. Stanišić M, Hald J, Rasmussen IA, Pripp AH, Ivanović J, et al. (2013) Volume and densities of chronic subdural haematoma obtained from CT imaging as predictors of postoperative recurrence: A prospective study of 107 operated patients. Acta Neurochir 155: 323-333.
14. Wi Kanyi JK, Ogada TV, Oloo MJ, Robert K Parker (2017) Burr-Hole Craniostomy for Chronic Subdural Hematomas by General Surgeons in Rural Kenya. World J Surg 42: 40-45.
15. Weigel R, Schmiedek P, Krauss JK (2003) Outcome of contemporary surgery for chronic subdural haematoma: evidence-based review. J Neurol Neurosurg Psychiatry 74: 937- 943.
16. Santarius T, Kirkpatrick PJ, Ganesan D, Chia HL, Jalloh I, et al. (2014) Use of drains versus no drains after burr-hole evacuation headbanging. The Lancet 102.
17. Stanišić M, Hald J, Rasmussen IA, Pripp AH, Ivanović J, et al. (2013) Volume and densities of chronic subdural haematoma obtained from CT imaging as predictors of postoperative recurrence: A prospective study of 107 operated patients. Acta Neurochir 155: 323-333.
18. Gökmen M, Sucu HK, Ergin A, Gökmen A, Bezirciodlu H (2008) Randomized comparative study of burr-hole craniostomy versus twist drill craniostomy; Surgical management of unilateral hemispheric chronic subdural hematomas. Zentralbl Neurochir 69: 129-133.
19. Gelabert González M, Iglesias Pais M, García Allut A, Martínez Rumbo R (2005) Chronic subdural haematoma: Surgical treatment and outcome in 1000 cases. Clin Neurol Neurosurg 107: 223-229.
20. Park SH, Kang DH, Park J, Hwang JH, Hwang SK, et al. (2011) Fibrinogen and D-dimer analysis of chronic subdural hematomas and computed tomography findings: A prospective study. Clin Neurol Neurosurg 113: 272-276.
21. Traynelis VC (1991) Chronic subdural haematoma in the elderly. Clin Geriatric Med 7: 583-598.
22. Cameron MM (1978) Chronic subdural haematoma: a review of 114 cases. J Neurol Neurosurg Psychiatry 41: 834-839.
23. Luxon LM, Harrison MJG (1979) Chronic subdural haematoma. Q J Med 189: 43-53.
24. Jones S, Kafetz K (1999) A prospective study of chronic subdural haematomas in elderly patients. Age Ageing 28: 519-521.
25. Lucas Bernardes Miranda, Ernest Braxton, Joseph Hobbs (2011) Matthew QuigLey: chronic subdural hematoma in the elderly: not a benign disease. J Neurosurg 114: 72-76.
26. Liu Y, Xia JZ, Wu AH, Wang YJ (2010) Burr-hole craniotomy treating chronic subdural hematoma: A report of 398 cases. Chin J Traumatol 13: 265-269.