Management of Chronic Subdural Hematoma in Adults at the Renaissance University Hospital Center in Ndjamena (Chad)

Yannick Canton Kessely[1], Aboulkhassim Mahamat Adam[1], Felicien G.Toudjingar[1], Olivier Li-lyané Ouambi[1], Donald Djasde[2], Aboubacar Aouami[3], Brahim Soukaya[3], Kader Ndiaye[4], Momar Code Ba[1]

1-Department of neurosurgery Hopital La Renaissance
2-Department of neurosurgery Hopital General la Reference nationale
3-Department of radiology Hopital La Renaissance
4-Department of anesthesia Hopital La Renaissance

Corresponding Author: Yannick Canton Kessely**.** Hôpital la Renaissance de Ndjari BP: 2029 N'Djamena (CHAD)**.** E-mail: kesselycanton@gmail.com

Abstract

Introduction: A chronic subdural hematoma (CSDH) is a collection of old blood between the dura mater and the cranial arachnoid. It is a commonly encountered condition in neurosurgery. The goal of the study was to describe the epidemiological, clinical, paraclinical, therapeutic, and evolutionary aspects of CSDH. **Methodology:** This was a prospective observational and descriptive study conducted over a 22-month period. Any patient presenting with CSDH on a cerebral CT scan and consenting to take part in the study was included. **Results**: CSDH accounted for 17% of cranial conditions hospitalized and 46.05% of intracranial hematomas. The patients' mean age was 56 +/- 17.6 years, with 42.8% ranging from 61 to 80 years. In 85.7% of cases, head trauma was the cause of the CSDH. High blood pressure was identified as a risk factor in 37.1% of the cases. COVID-19 was associated with two cases of CSDH. 17.1% of patients were dehydrated. Anemia was found in 65.7% of cases. In 57.1% of cases, the hematoma was located in the left hemispheric region. Surgery was performed in 85.7% of the cases. In 91.4% of cases, the post-therapeutic outcome was favorable. The overall mortality rate was 8.6%. **Conclusion:** In our practice, CSDH is a relatively common but underdiagnosed condition. The prognosis is favorable if treated early.

Keys words: hematoma, head, Chad

INTRODUCTION

A chronic subdural hematoma is an "old" collection of blood and blood breakdown products between the surface of the brain and its outermost covering when bridging veins tear and leak blood. Chronic subdural hematoma is one of the most frequent pathologies in neurosurgery. It is a public health problem because of its frequency in the elderly, its severity, and its spontaneous evolution. It requires urgent neurosurgical management. CSDH has been the subject of numerous studies worldwide. Its incidence in the general population is 13.1 per 100,000 population per year (1). This proportion increases after the age of 65 years, from 3.4/100,000 in patients under 65 years to 58.1/100,000 after 65 years (1). In France, the incidence of CSDH was 13 cases per 100,000 people in 2016 (2). In Africa, the incidences of CSDH are 4.26% in Togo, reported by Doleagbenou et al. (3), and 13 scanographic diagnoses per year for a

population of 12,000,000 inhabitants in Cameroon, reported by Dongmo et al (4).]. In Chad, the data (epidemiological, clinical, therapeutic, evolutionary, and economic) on CSDH remain unreported to the best of our knowledge. This study therefore aims to (give the objective of the study).

MATERIALS AND METHODS

This is a prospective, observational study with a descriptive goal that was conducted over a 22-month period, involving patients of both sexes and all ages who were admitted to the teaching hospital "La Renaissance" for the treatment of a CSDH.Non-consenting patients and those who presented a hygroma during neuroradiological investigations were excluded from the study. The SCHWARTZ formula was used to calculate the minimum sample size: N = 2p(1-p)/i2 [n: sample size,: confidence level (the standard 95% confidence level value will be 1.96), p: estimated proportion of the population with CSDH (2%), i: desired precision for the value of p (5%)].By doing the calculation, we obtained n = 30 as the minimum size.

RESULTS

We collected 205 cases of traumatic brain injury (TBI) and 81 cases of intracranial hematomas, including 35 cases of CSDH, during the study period. CSDH accounted for 13% of TBI and 43.2% of all intracranial hematomas. The mean age during our study was 56 ± 17.6 years, with extremes of 17 and 82 years (Table I).

Table I: Distribution of patients by age group.

Age range in year	Number (%)
< 20	3 (8,6)
21-40	5 (14,3)
41-60	11 (31,4)
61-80	15 (42,8)
81-100	1(2,9)
Total	35 (100)

The age range of 61 to 80 years concerned 42.8% of the patients. The male sex represented 80% of the cases, i.e., a sex-ratio of 4. In this study, 31 patients were right-handed, i.e., 88.6%. Retired people represented 45.7% of the patients (n = 16), followed by civil servants (20%) and farmers (14.3%). The notion of head trauma was found in 85.7% of cases; 37.1% of patients were hypertensive, and 34.3% were taking antiplatelet agents. Chronic alcoholism was found in 22.9% of patients, and 5.7% had contracted COVID 19.

Of those who had a history of head trauma, an interval of 4 to 8 weeks before the appearance of the first signs was reported by 36.7% of patients. The mean time to head injury was 8 weeks, with extremes of 3 and 23 weeks. The TBI was benign in 56.7% of cases. The Glasgow score was between 15 and 13 in 68.8% of cases; 11.4% had a Glasgow score lower than 8 on admission. A good general condition was recorded in 68.6% of cases (n = 24). High blood pressure was reported in 37.1% of patients. Isolated headache represented 48.6% of cases (n = 17), intracranial hypertension syndrome was found in 45.7% of patients. Urinary incontinence was recorded in 31.4% of cases. Neuropsychic disorders were reported in 34.3% of patients (n = 12). Motor deficit was present in 60% of cases, with hemiparesis accounting for 31.4% of cases; 22.4% of patients were

hemiplegic.Tonic-clonic convulsions were the type of comitiality realized in 8.5% of cases. Patients were dehydrated in 17.1% of cases. Pupils were isocore reactive in 82.9% of cases. Stage 2 of the Markwalder classification was found in 54.3%, and 20% were stage 3.

On biological examination, a hemoglobin level below 13.6 g/dl was found in 65.7% of cases. The platelet count (150,000–400,000/mm³) was normal in 11.4% of cases. Prothrombin was normal in 94.3% of patients. Hyponatremia was observed in 20% of cases (n = 7) and hypokalemia in 25.7% of cases. Hypochloremia was found in 25.7% of cases. Creatinine levels were elevated in 14.3% of cases (n=5). Alanine aminotransferase was elevated in 5.7% of cases.

A cerebral CT scan was performed in all cases (n = 35). In 57.1% of cases (n = 13), the hematoma was located in the left hemispheric region.It was bilateral in 25.7% of cases. The hematoma was hypodense in 60% of cases, mixed in 25.7%, and isodense in 14.3% (Figure 1).

Twelve patients had a maximum hematoma thickness of more than one centimeter (>1 cm) on the brain scan, i.e., 34.3%. The cerebral CT scan showed a mass effect in 60% of patients. In 8.6% of cases, the lesion was hemorrhagic contusion, and in 5.8% of cases, it was linear fracture.Adjuvant medical treatment was instituted in 100% of cases, followed by surgical treatment in 85.7% of cases. Rehydration was oral in 35 cases (100%), analgesics were taken in 97.1% of cases, and the COVID protocol was adopted in 5.7% of patients. Trepanation was performed in 71.4% of cases (n = 25) under general anesthesia (Figure 2).

The drain was removed in 82.9% of cases (n = 29) after 48 hours, with a mean of 2.05 days +/- 1.28 days. The average hospital stay in our study was 7 days +/- 2.98 days, with extremes of 3 and 16 days. The evolution was favorable in 91.4% of cases (n = 32). The follow-up brain scan was performed one month after surgery (Figure 3). Complications were recorded in 14.3% of cases; empyema was the type of complication recorded in 5.7% of cases (n = 2), intraparenchymal hemorrhage in 2.9% of cases. The mean follow-up of the patients was 13.3 months +/- 6.6 months, with extremes of 3 to 22 months. The interval of 7 to 12 months of follow-up concerned 31.3% of patients (n = 10). Three patients died (8.6%), including one case of pulmonary embolism (2.9%), one case of severe hypernatremia (2.9%), and one case of septic shock (2.9%).

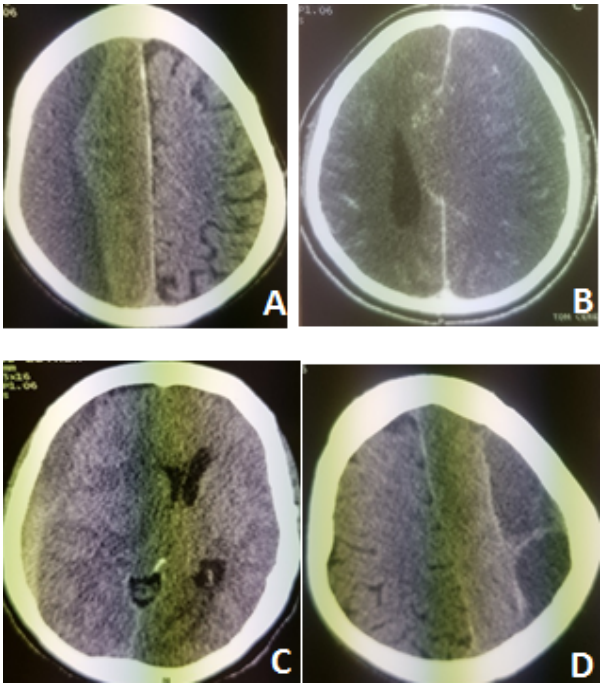

***Figure 1**: Axial slice brain CT, parenchymal window demonstrating a right hemispheric chronic subdural hematoma in (A), a left fronto-parietal isodense chronic subdural hematoma in (B), a right fronto-parietal chronic subdural hematoma with rebleeding in (C), and a left parieto-frontal partitioned chronic subdural hematoma in (D).*

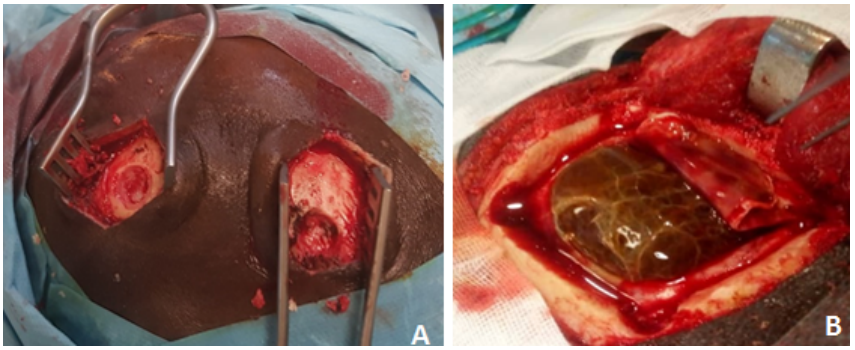

***Figure 2**: Intraoperative images, two trepan holes (A) and flap realization in the setting of a partitioned CSDH (B).*

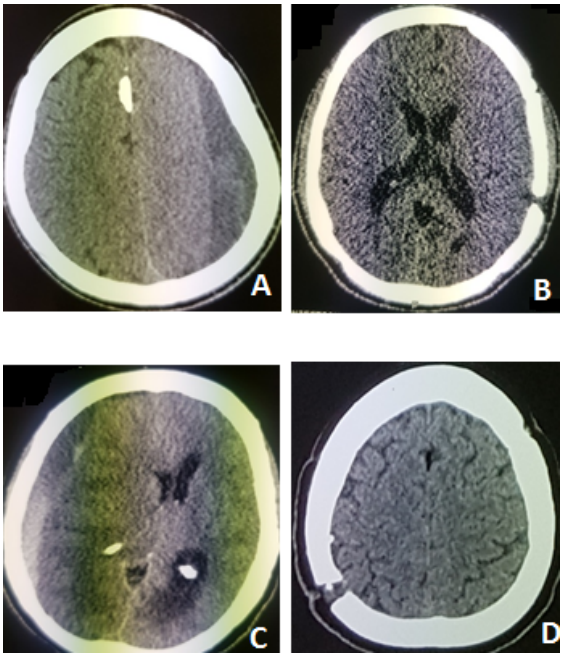

***Figure 3**: Axial slice brain CT scan showing DCSH in (A) left, and (C) right. In (B) and (C) control imaging performed one month after the surgical procedure showing the drill holes and not objectifying the presence of DCSH.*

DISCUSSION

CSDH accounted for 17% of hospitalizations for cranial disorders and 46.05% of intracranial hematomas. This high frequency in our series could be explained by the lack of a neurosurgery care unit in Chad and the convergence of patients suffering from CSDH at the only management center. The age range of 61 to 80 years predominated in our study (42.8%), as did the male predominance (80%). These data are in agreement with the literature (5, 6). Retired people represented 45% of the patients, which could be explained by the fact that CDHS is a disease of the elderly. TBI was the most frequent etiology in our series (85.7%). This observation is shared by many authors: Bankole et al. (7) and Djintcheu et al. (8).

Arterial hypertension (AH) was the second risk factor and was found in thirteen (13) patients (37.1%). It was also the second etiology implicated after a CT scan in the series of Adachi et al. (9), who reported 52.5% with hypertension.

Anticoagulant use was not reported in any of our patients. Chronic alcoholism has been identified by many authors as a factor favoring the occurrence of CSDH, notably by

Bankole et al. (7) and Ekouele et al. (6), who found 43.3% and 48%, respectively. It was 22.9% in our study. Diabetic background was found in 11.4% of our patients; Miguel et al. (10), in their study, reported a proportion of diabetic patients in 13.7%. After a head injury, the clinical picture of CSDH emerged within an average of 8 weeks.According to Liliang et al. (12), the most important reason for the discovery of CSDH was isolated headache.Isolated headache was reported in 48.6% of cases and headache as part of the CSDH syndrome in 45.7% of cases, a much lower rate than that reported by Ekouele et al. (6), which was 88% of cases.

Motor deficits were reported in 60.0% of cases in our study. It was 57% in the study by Mwanyombet et al. (13), and 62% in the study by Bankole et al. (7).

Neuropsychic disorders were reported in 34.3% of cases; Emerson et al. (14) reported them in 35% of cases. Jomli et al. (15), on the other hand, reported psychotic decompensation of chronic subdural hematoma in 50–70% of cases.

Anemia was found in 65.7% of cases and was related to the sequestration and destruction of red blood cells within the subdural hematoma.

The location of the hematoma on the brain scan was unilateral in 74.3%; Emerson et al. (14) and Broalet et al. (16) had reported a unilateral location in 66.60% and 77.79%. The CSDH was hypodense in 60% of the cases, this predominance of hypodensity was also reported by Mwanyombet et al. (13) in 56.6% of the cases. The mass effect on the CT scan was 60% in our study, which would be due to the pressure exerted by the effusion on the cerebral structures. Corticosteroid therapy was used in 14.3% of our patients, both for those who did not have intracranial hypertension syndrome and for whom there was no scanographic mass effect and for those with several associated defects. According to Ekouele et al. (5) and Bankole et al. (7), general anesthesia was used in 74.3% of cases, with rates of 91.30% and 95%, respectively.Djintcheu et al. (8), on the other hand, had recourse to local anesthesia at 3.7%. According to Marckwalder (17) and Okada (18), trepanation (one-hole or burr hole) is the preferred technique in the surgical treatment of CSDH. In our series, 71.4% of the patients had received a two-hole trepanation and 14.3% a flap. Our results are similar to those of Dongmo et al. (4) and Bankole et al. (7), who reported, respectively, 77.5% and 95.9% for trepanation and 22.5% and 4.1% for cranial flap with trephine.

We noted a favorable evolution in 91.4% of cases. This finding is comparable to those of Bakhti (19) and Dran et al. (20), who reported 86.5% and 80%, respectively.Operated CSDH becomes complicated in 5–19% of cases, with a re-intervention rate of 2.7–30% (21). We reported a complication rate of 14.3%. We observed a rebleed in 2.9%. This result is similar to those of Broalet et al. (17) and Mori (22), who reported 2.4% and 2.6%, respectively. We recorded two cases of cerebral empyema, or 5.7%, which is higher than the rate reported by Dran et al. (20), who reported a rate of 1.5%. This difference could be explained by their larger sample size than ours. The occurrence of cerebral empyema in our study is explained by prolonged postoperative drainage, beyond 3 days. Compressive pneumocephalus was the most frequent complication found in the literature (23, 24). In our study, we reported 2.9% of compressive pneumocephalus. We recorded three (03) cases of death, i.e., 8.6%. The duration of hospitalization varied from 3 to 16 days, with an average of 7 days. This result is comparable to those of Doleagbenou et al. (3) and Bakhti (19), who reported a mean duration of 8.2 and 5.38 days, respectively. The average follow-up of

our patients was 13.3 months +/- 6.6 months, with extremes of three to twenty-two months. This result is lower than that of Dran et al. (20), who reported a mean follow-up time of 17.5 months.

CONCLUSION

CSDH is a relatively frequent pathology but still under-diagnosed in our practices in Chad. The predominance is male, and head trauma is the most common etiology. Ionic disorders are frequent and must be investigated and corrected. Management is essentially surgical. The post-treatment evolution is generally favorable.

Conflict of interest declaration: none

REFERENCES

1. Guénot M. Hématome sous dural chronique : de la clinique au traitement. La lettre du neurologue. mars 2003; 7(3):89-92.
2. Cuny E, Roche P-H, Moreau J-J, Vignes B JR, C B, K. Neurochirurgie. 1ère. Paris: Elsevier Masson SAS; 2016. 145-6.
3. Doleagbenou A.K, Ahanogbe H.K, Kpelao E.S, Beketi A.K, Egu K. Bilan de 24 mois d'activités neurochirurgicales au Centre Hospitalier Universitaire Régional Lomé commune (Togo). Africain Journal of Neurochirurgies sciences. 2019; 38(1):3-10.
4. Dongmo L, Juimo A.G, Eloundou N.J, Njamnshi A.K, Avdeeva V, Tiyou C. Hématome sous dural chronique au Cameroun. Aspects cliniques, radiologiques et thérapeutiques. A propos de 43 cas. Méd Afr. Noire. 1999; 46 (3)
5. Ekouele M.H.B, Boukassa L, Ngackosso OB, Otiobanda GF, Matali E, Moyikoua R, et al. Hématomes sous-duraux chroniques. Ann. Univ. M NGOUABI. 2016; 16(1):19-26.
6. Minna R, Pauli H, Heini H, Paula H, Garant L.I, Tero N et al. Chronic subdural hematoma-incidence, complications and financial impact. Acta Neurochirurgica. 2020; 162: 2033-43.
7. Bankole O.B, Yusuf A.S, Kanu O.O, Efosa U, Nadi M.N, Arigbabu S.O. Chronic subdural haematoma: Clinical presentation, surgical treatment and outcome at the Lagos University teaching Hospital. African Journal of Neurological Sciences. 2011; 30(1), 10-17
8. Djintcheu V.P, Esiene A, Yamgoue T, Tchaleu B, Minkande J. Traitement chirurgical et devenir de 195 cas d'hématomes sous duraux non aigus à l'hôpital central de Yaoundé : Nécessité d'un point de repère pour les 2 trous de trépan ; African Journal of Neurological Sciences. 2011; 30(2): 21-27.
9. Adachi A, Higuchi Y, Fujikawa A, Machida T, Sueyoshi S, et al. Risk Factors in Chronic Subdural Hematoma: Comparison of Irrigation with Artificial Cerebrospinal Fluid and Normal Saline in a Cohort Analysis. PLoS ONE 9(8) 2014: e103703. doi:10.1371/journal.pone.0103703
10. Miguel Gélabert Gonzalez et al., Chronic subdural heamatoma: Surgical treatment and outcome in 1000 cases. Clinical Neurology and Neurochurgery 3 April 2005; 107: 223-9
11. Ayele A, Kuma A, Kifelew S, Tafesse A, Tirsit A. Hématome sous dural chronique bilatéral secondaire à une ponction lombaire. African Journal of Neurological Sciences. 2020; 39(5).
12. Liliang PC, Tsai YD, Liang CL, Lee TC, Chen HJ. Subdural haematoma in young and extremely aged adults: a comparative study of two age groups. Injury, Int J. Care Injured. 2002: 33(4): 345-348.
13. Mwanyombet L.O, Lada, Loembe P. Traitement des hématomes sous duraux chroniques à Libreville : Revue de 102 cas. African Journal of Neurochirurgie Science. 2011; 30(2):29.
14. Emerson B, Bodelson M, Larsson EM, Rommer B. Spontaneous intracranial hypotension resulting in coma: case report. Neurochurgery. 2013; 59(1): E204.
15. Jomli R., Zgueb Y., Nacef F., Douki S.. Hématome sous dural chronique et decompensation psychotique. L'Encephale. 2012 ; 38(1) : 356-9.
16. Broalet E., Haidara A., N'Dori Oka D., Topka A. Complications de la chirurgie de l'hématome sous dural chronique de l'adulte. Rev. Col. Odonto-stomatol. Afr. Chir. Maxilo-fac. 2011; 18(3): 53-7.
17. Markwalder TM, Steinsieger KF. Classification clinique des hématomes sous-duraux. J Neurosurg 1981; 55: 390- 6.
18. Okada Y, Akai T, Okamoto K, Iida T, Takata H, Iizuka H. A comparative study of the treatment of chronic subdural haematoma: burr hole drainage versus burr hole irrigation. Surg Neurol. 2002; 57(6): 405-9
19. Bakhti S. Les hématomes sous duraux chroniques de l'adulte : proposition d'un protocole de prise en charge 2012 ; 236-249.
20. Dran G, Bertheir F, Fontaine D, Rasenrarijao D, Paquis P. Efficacité de la corticothérapie dans le traitement adjuvant des hématomes sous-duraux chroniques. Etude rétrospective sur 198 cas. Science Direct. 2007; 6: 277-82.
21. Hamilton MG, Frizzel JB, Tranmer BI. Chronic subdural hematoma: the role for craniotomy reevaluated. Neurosurgery1993; 3(3): 67-72.89.
22. Mori K, Maeda M. Risk factors for the occurence of chronic subdural haematoma after neurosurgical procedures. Acta Neurochir (Wien); 2003: 145(7): 533-540.
23. Sambasivan M. An overview of chronic subdural hematoma: Experience with 2300 cases. Surg Neurol 1997; 47(1): 418-422.
24. Pancalet P. Formes cliniques et facteurs pronostics de l'hématome sous dural chronique de l'adulte. Neurochirurgie; 2001: 47(5): 469-72.