ORIGINAL ARTICLE

Chronic Subdural Haematoma in Zaria

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ABSTRACT

Objective: To determine the demographic pattern, risk factors, clinical presentation, imaging pattern and outcome of surgical management of chronic subdural haematoma (CSDH) in Ahmadu Bello University Teaching Hospital, Zaria, North-West Nigeria.

Methodology: A retrospective study of case notes, operation registers and operation notes of 30 patients with CSDH, who had surgical treatment at Ahmadu Bello University Teaching Hospital, Zaria, from May 2007 to April, 2015.

Results: The series included 24 males (80%) and 6 females (20%), age range 7months-90years and mean age 45years. History of trauma to the head was obtained in 27 patients (90%), and mean interval from trauma to appearance of symptoms was 15.5days. The most common risk factor, besides trauma, was hypertension (23.3%). The principal symptoms were headache (53.3%) and altered consciousness (50%). The CSDH was left-sided in 12 patients (40%), right-sided in 8 (26.7%), and bilateral in the remaining 10 patients (33.3%). Post-operative complications occurred in 4 patients (13.3%), and were successfully treated, while 5 patients (16.7%) died in the hospital.

Conclusion: Chronic subdural haematoma presents at a relatively younger age in our centre than generally documented elsewhere; and the most common cause is trauma, particularly from motorcycle-related accidents. No statistically significant relationship was established between age and outcome, or between GCS at presentation and outcome.

DISCLOSURES: NONE

Keywords: *Burr hole, head trauma, hypertension, intracranial haemorrhage*

INTRODUCTION

Chronic subdural haematoma (CSDH) is an encapsulated collection of blood, mostly liquefied and located between the dura mater and arachnoid.[1,2] The age of the collection is beyond 3weeks after an event or ictus, and it is typically hypodense to brain parenchyma on computed tomography (CT).[1,3] It has an annual reported incidence of 0.001–0.007%.[1,2,4] It may arise from acute subdural haematoma, but more commonly arises from subdural hygroma.[5,6]

The incidence has been noted to be highest in the elderly due to their generalized cerebral atrophy and increased venous fragility.[3,7,8] It is, also, more common among males than females.[3,7,8,9,10,11] While trauma to the head,

albeit minor, is a recognized cause of CSDH, an actual history of trauma is elicited in only 50-77% of cases.[1,3,7,8,9,10] Other implicated risk factors include anticoagulants, clotting disorders, hypertension, alcohol abuse, CSF shunting and arachnoid cyst.[4,7,8,12] A case has been reported following headbanging to rock music.[12]

Clinical presentation is variable and may include behavioural changes, altered consciousness, headache, hemiparesis, cognitive disturbances, seizures, faecal and/or urinary incontinence.[3,9] It may also be an incidental image finding in asymptomatic individuals being followed-up for mild head injury.[9] Computed tomography (CT) remains the most important diagnostic test.[13]

Chronic subdural haematoma is often successfully treated surgically by twist drill or burr hole craniostomy.[3,9,14] Craniotomy may also be employed in some cases.[15,16]A subdural drain is commonly inserted after evacuation of CSDH, with or without irrigation, and is associated with reduced recurrence and mortality.[11,17] Non-operative management has also been done with various rates of recurrence reported.[9,18] In our unit, burr hole craniostomy with closed-system drainage has been the operative procedure of choice.

The purpose of this article is to present the demographic pattern, risk factors, clinical presentations, imaging findings and outcome of treating CSDH in our centre, over an 8-year period.

Abbreviations used in this paper: CSDH = chronic subdural haematoma; RTA = road traffic accident; CSF = cerebrospinal fluid; CT = computed tomography; MRI = magnetic resonance imaging; GCS = Glasgow coma scale / score; GOS = Glasgow outcome score

METHODOLOGY

A total of 50 patients with CSDH were treated surgically at the Ahmadu Bello University Teaching Hospital, Zaria from May 2007 to April 2015. However, only 30 case notes were available for analysis. Records of the remaining 20 patients were incomplete; hence, they were excluded from the study.
Information was obtained retrospectively, by reviewing operation registers, patients' case notes and operation notes. Data, including age, sex, predisposing factors for CSDH, presenting symptoms and signs, image findings, outcome of treatment as at discharge from hospital and complications, were collated and analysed using Statistical Package for Social Sciences (*SPSS version 20.0*). The *Spearman* correlation test was used for level of statistical significance, with result regarded as significant when $p<0.05$.

Of the cases studied, diagnosis was based on CT scan in 29 and on MRI in 1. The MRI was requested in the single case because the CT-scanner in the hospital was not functional at the time the patient presented.

Treatment was operative in all reviewed cases, as they all had significant symptoms attributable to the diagnosed CSDH. The operations were generally performed under general anaesthesia, but local anaesthesia was used in patients with high operative risk. Burr hole drainage was performed in all the cases. Two ipsilateral burr holes were made in cases of unilateral CSDH, and in bilateral cases, one burr hole was made on each side.

Decompression was achieved with durotomy using a cruciate incision, and slow evacuation of the haematoma with careful irrigation using tepid normal saline through a rubber catheter gently placed in the subdural space. The catheter was connected to a closed-system drain and left in place for 48hours. Glasgow Outcome Score (*GOS*) was assessed at discharge from the hospital.

RESULTS

This series included 24 males (80%) and 6 females (20%), age range 7months to 90years and mean age 45years. The age distribution of cases is summarized in Table 1.

Trauma was the leading aetiological factor identified in 27 patients (90%), and the mean

interval from trauma to appearance of symptoms was 15.5days (range 0-148days).

Table 1. Age distribution of CSDH cases

Age (years)	Frequency	%
< 40	10	33.3
40 – 60	11	36.7
> 60	9	30.0
Total	**30**	**100.0**

Of these, 18 (66.7%) suffered trauma from motorcycle-related accidents, 8 (29.6%) from motor vehicular accidents, and only 1 patient (3.7%) fell from height. Another major risk factor identified was hypertension - 23.3% of the reviewed cases had a pre-morbid diagnosis of hypertension.

Table 2.Aetiology and concomitant diseases

	Frequency	%
Aetiology		
Trauma	**27**	90.0
motorcycle	*18*	
motor vehicle/tricycle	*8*	
fall from height	*1*	
Spontaneous	**3**	10.0
Total	**30**	**100**
Concomitant disease/risk factors*		
Hypertension	7	23.3
Diabetes mellitus	2	6.7
Alcohol abuse	3	10.0
Cigarette smoking	2	6.7

**More than one disease/risk factor per patient is possible*

The main presenting features were headache (53.3%) and altered consciousness (50%), while the majority of cases (60%) had a GCS of 13–15 at presentation. Details of other presenting features and the GCS at presentation are presented on Table 3. Most of the haematomas (40%) were left sided, 8 (26.7%) were right-sided, while the remaining10 (33.3%) were bilateral.

Post-operative complications occurred in 4 patients (13.3%), and were all successfully treated. These include simple pneumocephalus in 2 patients, surgical site infection in 1 patient and cerebral abscess in 1. Another 5 (16.7%) died in the hospital, but most of the patients (73.3%) had a GOS of 5 (*Tables 4 and 5*). Bivariate analyses of age against outcome, and GCS at presentation against outcome did not show any statistically significant relationship.

Table 3. Presenting features and GCS (*n = 30*)

	Frequency*	%
Presenting features		
Headache	16	53.3
Altered consciousness	15	50.0
Hemiparesis	8	26.7
Urinary/faecal incontinence	6	20.0
Speech difficulty	4	13.3
Convulsion	3	10.0
Change in behaviour	1	3.3
GCS at presentation		
13 – 15	18	60.0
9 – 12	7	23.3
3 – 8	5	16.7

**More than one presenting feature per patient is possible*

Table 4. Comparison of age with GOS

Age	GOS at Discharge				Total
	1	2	3	5	
< 40	0	1	2	7	10
40-60	3	0	0	8	11
> 60	2	0	0	7	9
Total	**5**	**1**	**2**	**2**	**30**

Comparing age with outcome showed no statistically significant difference (p>0.05)

GOS: 1 = Death
2 = Persistent vegetative state
3 = Severe disability
4 = Moderate disability
5 = Full recovery

Table 5. Comparison of GCS with GOS

GCS	GOS at discharge				Total
	1	2	3	5	
3 - 8	0	1	1	3	5
9 -12	3	0	0	4	7
13-15	2	0	1	15	18
Total	5	1	2	22	30

Comparing post-resuscitation GCS with outcome showed no statistically significant difference (p>0.05)

DISCUSSION

The age range of patients was 7months to 90years, with a mean of 45years. Only 9 patients (30%) were>60years. A younger mean age is observed in this study than is reported by other workers, who have observed that CSDH is predominantly a disease of the elderly.[4,3,8] Ramachandran and Hegde in their series of 647 cases of CSDH, had ages ranging from the first to the ninth decades of life, with most of them being men in the sixth to seventh decades.[3] In another retrospective analysis of 1000 cases of CSDH by Gelabert-González', *et al*, age range of patients was 12–100years,with mean age 72.7±11.4years, while in Baechli's work, 69% of the cases were ≥65years old.[4,8] The male preponderance of 80% observed here, however, is consistent with findings of 62.8–82.5% in other studies.[4,3,8,10,11]

The most common presenting feature identified among our patients was headache (53.3%).In Ramachandran's series, altered behaviour was the most frequent presenting feature, identified in 66% of reviewed cases, while hemiparesis was the most common feature (42.9%), in Kuroki's series.[3,11] The preponderance of headache in this study may be due to the relatively young average age of the patients. Headache and other features of raised intracranial pressure such as vomiting and papilloedema, tend to occur more frequently in younger patients, than in the elderly.[1]The intracranial space created by cerebral atrophy in the elderly accommodates the haematoma without massive pressure on adjacent brain tissue, hence, the lower tendency towards elevation in intracranial pressure.[4,7,10]This view is supported by a comparative study of two age groups by Liliang and colleagues.[7]

The history of trauma was obtained in 90% of the reviewed cases. Of these, 66.7% suffered trauma from motorcycle-related accidents, 29.6% from motor vehicular accidents, and only 1 patient (3.7%) fell from height. Trauma, even if trivial, is the most common cause of CSDH in both younger and older patients, but a history of direct trauma to the head may be absent in up to half the cases.[1,7] The 90% trauma rate in this study is higher than was observed by Adhiyaman, Ramachandran, Liliang, Baechli, Kageyaman and Foelholm, who reported a history of trauma in 50–77% of their reviewed cases.[1,3,7,8,9,10] It is possible that in this environment, many non-traumatic cases of CSDH present to peripheral hospitals and are managed as presumed cases of 'stroke' without any imaging support. Therefore, they never get diagnosed or referred to our centre. This may also be the reason for the younger mean age of cases in this study, as many of such presumed 'stroke' patients were elderly.

The mean interval between trauma and onset of clinical symptoms was 15.5days (range 0 to 148days). Despite the early onset of symptoms in some patients, diagnosis was only achieved when the haematoma had become chronic. This may be due to delayed presentation, initial misdiagnosis in some, and delay in obtaining requested CT scan due to the cost.

The other prevalent risk factor in this series besides trauma is hypertension, the history of which was obtained in 23.3% of cases. Other risk factors which have been implicated in other studies, such as anticoagulant usage, bleeding disorders, ventriculo-peritoneal shunting, brain tumours, previous history of CSDH, and even, rarer causes like headbanging to rock music, were all absent.[7,8,12] Underlying vascular anomalies could not be ruled out in the non-traumatic cases since vascular studies such as angiography were not carried out on any of the patients.

Of the cases reviewed in this series, 60% had GCS 13-15 at presentation, which compares with 62% in Ramachandran's series.[3]Left-sided, right-sided and bilateral CSDHs constituted 40%, 26.7% and 33.3% of cases, respectively. In Kageyama's series, they constituted 29%, 33% and 38%, respectively; while in Gelabert-González's work, they constituted 47.1%, 43.2% and 9.7%, respectively.[4,9] In a comparative study by Kuroki, of two groups of patients, who had two treatment modalities conducted for

CSDH, 9% and 11% of them were bilateral in the two groups, respectively.[11] No specific pattern of laterality is observed from these studies.

The post-operative complication rate of 13.3% (4 cases) obtained, is consistent with rates of 4 to 19.6% reported in other series.[4,7,16] This study recorded no case of recurrence. This may be due to the fact that cranial CT scan was not routinely requested post-operatively and/or on follow-up, due to financial constraints on most patients. Some cases of recurrence, albeit asymptomatic, may therefore, have been missed.

The mortality rate of 16.7% in this series is higher than rates of 0-13% that have been observed by some workers.[4,3,8,11,16,19] Four of the five mortalities were from severe sepsis, and they occurred within a 2-month period (February - March 2011). It is suspected that a major breach in asepsis or an outbreak of a very virulent micro-organism occurred within that period, resulting in such a high rate of severe sepsis and consequent mortality. This cannot be confirmed though, as no documentations were made to that effect in the reviewed notes. Outside this specified period, however, only one other mortality was recorded, reflecting the generally low mortality rate of current CSDH management.

This study did not establish any significant relationship between age and outcome, or GCS at presentation and outcome. Van Havenbergh and Adhiyaman, however, identified the neurological state of the patient as the most important prognostic factor in CSDH.[1,20] The GCS at presentation is an index of neurological status. Ramachandran also, identified patient's age and associated illnesses like cardiac or renal failure, as the statistically significant determinants of mortality.[3] Gelabert-González on the other hand found poor prognosis to be related to age (>70 years) and clinical grade on admission; while Villagrassa identified personal background of alcoholism or coagulopathy, lower GCS score, haematoma thickness >2cm, respiratory and neurological complications to be the determinants of poor outcome.[4,19]

CONCLUSIONS

Patients presenting with CSDH in this centre are relatively younger than generally reported in other series; and consistent with this, the leading clinical feature on presentation is headache. Trauma is the predominant cause of CSDH, and motorcycle-related accidents are, by far, the most common. Enforcement of safety measures on motorcycle users may significantly reduce the incidence of CSDH. No significant relationship was found between age and outcome, nor was there any between GCS at presentation and outcome. A further study on a larger series is, however, required to confirm this.

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