TREATMENT OF CHRONIC SUBDURAL HAEMATOMA: CASE FOR SINGLE BURR-HOLE CRANIOSTOMY AND IRRIGATION

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Abstract

Introduction: Chronic subdural haematoma (CSH) is a common neurosurgical disease in the elderly which can pose diagnostic challenge. The best means of its surgical management remains controversial. Current treatment options include burr-hole craniostomy, twist-drill craniostomy or craniotomy with or without closed tube drainage. While burr-hole craniostomy is often the most used technique, there are no articles that provided class 1 evidence with respect to recurrence rates and complications.

Objective: To review retrospectively the results obtained in our centre using the single burr craniostomy with irrigation.

Patients and Methods: Two cases of CSH are reported and our local experience analysed. The data were obtained by the review of all the records of CSH cases treated at the Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria between February 2006 and January 2008.

Results: There were 22 patients (19 males, 3 females). All were operated on. The median age was 65years. Two patients were alcoholics and CSH followed endoscopic third ventriculostomy in one case. The most common side affected was the left (Left side 10, Right side- 8, Bilateral 5). Post-operatively there were neither recurrences nor mortality.

Conclusion: We conclude that for the treatment of the CSH, single burr-hole drainage with irrigation is associated with acceptable and satisfactory outcome. But a long term study will be appropriate to appropriately document the long term recurrence rate.

Introduction

Chronic subdural haematoma (CSH) is one of the most frequent neurosurgical conditions and it refers to the collection of blood and blood breakdown products between the surface of the brain and its outermost covering, the dura. They are defined as haematomas of more than 20 days of age (typically determined by patient history)[1].

This disease entity usually follows minor head trauma and occurs commonly in the elderly population with a peak incidence in the sixth and seventh decades of life; though all age groups can be affected[2, 3]. The incidence of CSH is approximately 1 in 100,000 populations per year; incidence increases to approximately 7 cases per 100,000 populations per year in the age 70 to 79 group[4].

It can manifest with variable neurologic signs and symptoms including stroke-like symptoms, confusion, hemiparesis, and seizures[3].

Significantly, CSH is a reversible cause of dementia[5]. Treatment for CSH has remained debatable, ranging from craniotomy to twist drill with or without closed system drainage[2, 3, 6-9]. Despite these treatment possibilities, the recurrence rate for CSHs ranges from 5% - 33% [3, 6,9,10].

Can the recurrence rate be decreased with any one surgical technique? Are there any predictors for recurrence rate? This report attempts to answer these questions with our local experience including case illustrations and review of the literature.

Patients and Methods: Two cases of CSH are reported in details and our local experience analysed. The data were obtained by the review of the records all patients with CSH treated at the Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria between February 2006 and January 2008. Glasgow coma scale score (GCSS) was used

to evaluate all patients pre- and post-operatively. Patients were discharged when self ambulant with GCSS of 15.

Two case illustrations are also discussed below.

Case Illustrations

Case 1

N. O. is a 12-month-old female child who presented with worsening restlessness and persistent vomiting of two weeks duration. Two days prior to presentation she became difficult to arouse. There was no antecedent history of head trauma or fever. She had been diagnosed earlier with congenital aqueductal stenosis for which she had a ventriculo-peritoneal shunt at 5 months of age. This failed from proximal shunt obstruction when she was 9 months of age. An endoscopic third ventriculostomy was subsequently done. The procedure was uneventful until this present presentation.

Physical examination revealed a 12.5-kg girl who was drowsy and lethargic. She was afebrile, not pale with bilateral papilloedema, dilated pupils which reacted sluggishly to light and bilateral abducent nerve palsy.

A diagnosis of raised intracranial pressure presumed to be secondary to closure of ventriculostomy stoma was made. Cranial computerized tomographic (CT) scan revealed bilateral chronic subdural haematoma with significant mass effect (figure 1). She immediately underwent single burr hole drainage and irrigation on both sides. The postoperative period was uneventful. The patient remains neurologically stable 8 months after drainage of the subdural haematoma with no recurrence.

Case 2

A. O. is a 64-year old man, known hypertensive who presented with bifrontal headaches of two weeks duration, progressively worsening left hemibody weakness, urinary incontinence and altered sensorium. There was no history of antecedent head trauma or use of anticoagulant. Initial treatment for stroke without neuroimaging was unsuccessful prior to referral. Vital signs on presentation were pulse rate of 65 beats per minute, blood pressure 160/100mmHg, respiratory rate of 22/minute, and temperature of 36.9^{o}C. Physical examination revealed an unconscious man who was lethargic with a Glasgow coma scale score of 7 (Eye opening 2, Best verbal response 1, Best motor response 4). Fundoscopic examination showed bilateral papilloedema. He also had bilateral sixth nerve palsy. His motor examination revealed a 2/5 strength on the left and 0/5 on the right with global hyper-reflexia.

Computed tomographic (CT) imaging of the brain is shown in figure 2. A diagnosis of chronic subdural haematoma (Markwalder grade 3, Bender grade 3) was made (Table 1 and 2). He subsequently had emergency burr-hole craniostomy and irrigation done. He made progressive remarkable improvement and was discharged 14 days after surgery, with a Glasgow coma scale score of 15, self ambulant and caring for self.

Results

There were 22 patients (19 males, 3 females) that were treated during the study period. Three patients were children (8 months, and two 1 year olds) (Table 1). The median age was 65 years (Figure 3). Two patients were alcoholics and CSH followed endoscopic third ventriculostomy in one case. On computerized tomographic scan, the collection was unilateral in 18 cases (Right sided-8, Left sided 10) and bilateral in 5 cases.
Post-operatively there were neither recurrences nor mortality.

Discussion

Unlike in epidural haematomas, which are usually caused by tears in arteries, subdural bleeding usually results from tears in the veins that cross the subdural space. As cerebral atrophy develops, the brain shrinks away from the dura and bridging veins are predisposed to tearing under shearing stress. Thus older adults are at increased risk for subdural hematomas due to fragility of bridging cerebral veins, even after a minor head trauma.

A history of trauma is elicited in most cases[2]. Men have a higher incidence of subdural haematoma due to a higher risk of trauma. This is reflected in our study (Table 3). Although trauma is the most common cause of subdural haematoma, the actual event may be so trivial that some older patients do not remember it. The aetiology is undetermined in 25% of cases; these are sometimes termed “spontaneous[7, 11]. Risks factors associated with spontaneous CSH include coagulopathy, thrombocytopenia, and alcoholism[4]. Alcoholics are at particular risk due to a propensity to fall, in addition to the probable underlying liver disease with secondary coagulopathy and thrombocytopenia.

Many subdural collections (haematomas or hygromas) resolve spontaneously before the onset of signs and symptoms[4]. A subset of these does progressively enlarge. Whereas several mechanisms have been proposed for their enlargement, only one has gained widespread acceptance. This proposed mechanism includes recurrent haemorrhage and fibrinolysis[4]. The outer membrane of the haematoma contains a fine network of capillaries. There is an ongoing process of bleeding into the haematoma due to activation of the coagulation–fibrinolytic system that result in defective haemostasis and clot formation. As a result, there is a slow accumulation of blood within the subdural space. The above case reports illustrate the variable presentation of CSH. They can present in the young or the elderly. Presentation may be spontaneous, or evolve over several weeks to months after trauma (usually minor). Chronic subdural haematoma can present as strokes, transient ischemic attacks, headaches, memory changes, confusion, seizures, hemiparesis, monoparesis, and tremors [2, 3, 7,8,12]. They have also been uncommonly known to present as Parkinsonism[13]. Indeed, CSH is a great "mimicker" of neurological diseases. Thus, they should be considered in the differential diagnosis of elderly patients presenting with neurological signs and symptoms.

After the diagnosis has been made, the treatment of this entity remains controversial[3, 6-9, 14-17]. The treatment options before the advent of CT scan was craniotomy to evacuate these haematomas. Some authors still advocate a small craniotomy with or without membranectomy[7, 14]. Sambasivan et al report a remarkable 30 year series of 2300 cases (since 1966) and advocate a small temporal craniotomy, with the dura left open and the subdural space communicating with the subtemporalis space[7]. This procedure, according to Sambasivan et al in India, has resulted in marked reduction of recurrence and

membranectomy has not been required; only 0.5% mortality was reported. Nevertheless, burr-hole irrigation is currently the most accepted treatment offered in CSH [6, 9]. Many studies now advocate a closed system drainage after irrigation of the subdural space to improve outcome and reduce the chance of recurrence [3,9,18]. However, the use of a drainage system remains controversial [3, 6].

Several newer treatment options have also been discussed in the literature. Smely et al advocate a twist-drill trephination and a subdural catheter kit for evacuation of CSHs [16]. The re-operation rate was 18.1% in the catheter kit group and 33.3% in the closed-system drainage group along with an 18.1% infection rate in this group (compared to 0% in the catheter kit group). Yoshimoto et al advocate a small craniostomy at the superior lateral angle of the forehead just beneath the hair-line- no infections and recurrence rate of 10% or 2/20 cases [19]. Hellwig et al as well as Rodziewicz et al adovate endoscopic treatment of CSHs, especially septated lesions [15, 20].

The goal of treatment is to be minimally invasive while at the same time preventing recurrences. The major debate arises whether one should leave a drain or not. It is argued that placing a drain can lead to complications without changing the rate of recurrence and/or clinical outcome [6, 14,16,21,22]. These potential complications include brain injury, further haemorrhage from neomembranes, infection [6, 16]. In all our patients, drains were not used and with good results. Although our follow-up is short, it is evident that a drainage system with its potential complication can be avoided. Thus far there has been no recurrence in our patient population.

In conclusion, the results at our institution indicate that single burr-hole craniostomy with irrigation for chronic subdural haematoma is a satisfactory surgical procedure with acceptable morbidity and mortality level.

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Table 1. Markwalder Neurologic grading systems for chronic subdural haematomas

Grade 0 No neurologic signs

Grade 1 Headache; reflex asymmetry

Grade 2 Altered mental status, hemiparesis

Grade 3 Stupor but responsive; hemiplegia

Grade 4 Coma; decerebrate or decorticate posturing

Table 2. Bender Neurologic grading systems for chronic subdural haematomas

Group 1 Normal mental function; no focal signs

Group 2 Lethargic; focal neurologic signs

Group 3 Stuporous; marked focal neurologic signs

Group 4 Coma; signs of hibernation (pupillary dilation,

decerebrate or decorticate posturing, respiratory arrest)

Table 3. Profile of patients with CSH and post-operative complication

Variable	Number of patients
Gender	
Male	19
Female	3
Diathermy burns	1
Recurrence	0
Mortality	0

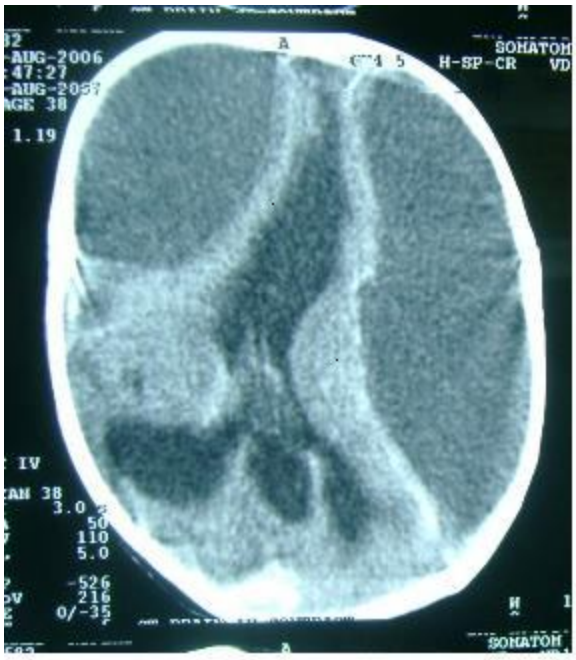

Figure 1: Cranial CT showing bilateral chronic subdural haematoma with mass effect.

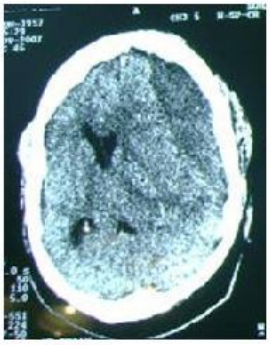

Figure 2: Cranial CT scan showing left-sided subdural haematoma with mass effect.

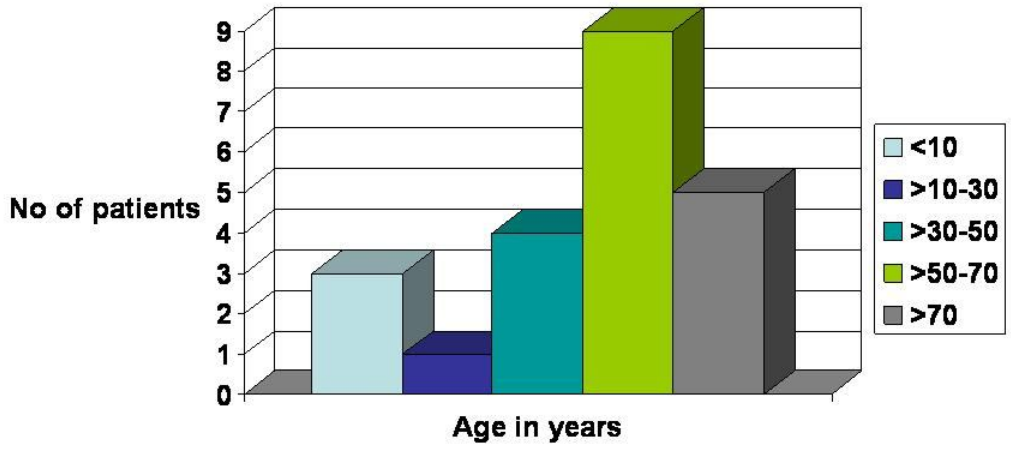

Figure 3. The age of the patients with CSH and their frequency