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Inaugural Epileptic Seizures Occurrence During or Immediately After Surgical Evacuation of Chronic Subdural Hematoma

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Abstract

We report a series of 9 patients who presented an initial epileptic seizure occurred during or immediately after surgery for a chronic subdural hematoma. Through literature data, we discuss the problem of anticonvulsant prophylaxis and its modalities in patients undergoing surgical evacuation of chronic subdural hematoma.

Materials and study Method

We carried out a retrospective and descriptive study over a period of 24 months. It involved adult patients who had an initial epileptic seizure during or immediately after surgical evacuation of chronic subdural hematoma (CSDH). The epidemiological, clinical and therapeutic parameters were studied.

Results

An epileptic seizure occurred during or immediately after chronic subdural hematoma surgery in 9 of the 69 patients who were operated. Our cohort was composed of 6 men and 3 women with an average age of 73.7 years. The average symptom duration was 19 days. Eight patients were classified MARKWALDER grade II. The hematoma was hemispherical and localized on the left side in 4 patients and partitioned in 5 patients. The seizure occurred during surgery in 5 patients

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and immediately after surgery in 2 others. It was generalized tonico-clonic seizure in 6 patients. Sodium valproate has been established as a background treatment in our cohort. The average length of hospital stay was 9 days. The evolution was favourable in 6 patients. Two patients died of refractory epilepsy.

Conclusion

Epileptic seizure occurrence can complicate surgical outcome of chronic subdural hematoma. Preventive treatment should be discussed if there are factors that could increase the risk of developing epilepsy.

Key words: chronic subdural hematoma; epilepsy; prevention; surgery

Introduction

Chronic subdural hematoma (CSDH) is a common neurosurgical condition. It can sometimes be responsible of seizures that can be a symptom of the disease or a sign of worsening. They are differently appreciated according to the authors. This explains the lack of consensus about prevention of this symptom in patients with chronic subdural hematoma. Epileptic seizures occurrence during or immediately after chronic subdural hematoma surgery can have serious consequences. This article prompts reflection on the need for preventive treatment of epilepsy in patient who undergo surgery for CSDH.

We report a series of nine patients who had inaugural epileptic seizures during or immediately after surgery for chronic subdural hematoma. Using the data from the literature, we will discuss the interest of preventive treatment for seizures in surgical management of chronic subdural hematomas.

Patients and Methods

We conducted a 24-month retrospective and descriptive study (April 2014 - March 2016), in three health structures of Bamako (Gabriel TOURE teaching hospital, EDEN Clinic and the Polyclinic of Friendship). It concerned patients who had at least an inaugural seizure during or immediately after surgical evacuation of CSDH.

This study included patients older than 18, who had no history of cerebral haemorrhage, epilepsy or taking antiepileptic drugs for any indication and patients who have never had an intracranial lesion. The patients' age and sex, the etiology of the hematoma, the clinical and radiological data as well as the treatment and the evolution were the parameters studied.

Results

Between April 2014 and March 2016, sixty nine patients were operated for chronic subdural hematoma (CSDH). Among them 9 patients had seizures during surgery or immediately after.

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They were 6 men and 3 women whose average age was 74 years (range 59 and 85). A head trauma was found in 4 patients. Two patients were known to be non-weaning chronic alcoholism. No etiology was found in 3 patients. The average consultation time was 19 days (range 7 and 42 days). Cognitive impairment and motor deficit represented the main clinical signs (Table I). All of our patients except one were classified grade II in the MARKWALDER classification (Table I). Cerebral computed tomography (CT) had made it possible to highlight a hypodense pericerebral collection with a mass effect on the median structures. This evoked chronic subdural hematoma. This collection was hemispherical and localized on the left side in 4 patients (Figure 1) and bilateral in 2 cases (Figure 2). Partitions were noted inside the hematoma in 5 patients (Figure 1). The hematoma density was mixed in 2 cases (Figure 3). The radiological characteristics of the hematomas are detailed in Table II. Surgical treatment for the hematoma consisted in making a drill hole in the frontal pole of the hematoma. This surgery was performed under local anesthesia in 6 patients. The evacuation of the hematoma followed by a drainage was performed in 6 patients. Drainage was not performed in the other 3 patients. The seizure had occurred during surgery in 5 patients. It was triggered immediately after surgery in 2 patients. Epilepsy started during surgery and continued postoperatively in two patients. Table III describes the surgical treatment, the type and the period of onset of seizures in our cohort. Seizure was generalized tonic-clonic in 6 patients. Clonazepam 1 milligram (mg) (Rivotril®) intravenously has been used urgently to stop seizures. All patients were started long-term therapy after the second epileptic seizure. That consisted of Sodium Valproate 500 mg tablets in 6 patients, Carbamazepine 200 mg in 2 patients and finally Gardénal 100 mg tablets in one patient. The immediate postoperative course was marked by status epilepticus in 2 patients and the persistence of hemiparesis in 2 other patients. The average length of hospital stay was 8.8 days (range 6 and 15 days). Two patients died in intensive care from a refractory status epilepticus. The follow-up was marked by an absence of seizure in 6 patients with a disturbed electroencephalogram (EEG) in 3 patients. In one patient, clonazepam was combined with sodium valproate because of persistent seizures. One patient had regressive right hemiparesis. The antiepileptic treatment was gradually stopped after 3 months on a standardized EEG in 4 of the 7 patients. At 6 months of evolution, treatment had been stopped in 5 patients. After 1 year follow-up, 2 patients were totally dependent on antiepileptic treatment. They were referred to a neurology consultation. Four patients had completely recovered from their neurological disorders and one patient was still in rehabilitation for a right brachial monoparesia.

Discussion

Chronic subdural hematoma (CSDH) is a frequent pathology in the elderly. Their annual incidence in the general population in United States was estimated at 7.2 to 10.3 per 100,000 population and is expected to increase to 8.8–17.1 per 100,000 people by 2030, given current trends in aging [1]. A predominantly male condition [2; 3] was found in our cohort, is most often secondary to sometimes minimal head trauma which leads to rupture of cortico-dural vessels (bridge veins). It has been found in the clinical history of 4 of our patients. Mwanyombet et al [3]

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had encountered it in 63.7% of cases in their cohort. Like 3 patients in our series, the etiology of the hematoma is not always found. The duration of symptoms is very variable. Some authors link it to the age of the patients by affirming that this period is all the more shortened as the patient is young [4]. This finding was not confirmed in our study where the average duration of symptom progression was 19 days for an average age of 73 years. This could be due to a recruitment bias imposed by our inclusion criteria mainly focused on cases of CSDH with per and postoperative seizures. Epileptic seizures are one of the major complications associated with CSDH, whether in the pre- or postoperative period. The incidence of epileptic events associated with CSDH reported in the literature varies considerably [1] and could potentially increase morbidity and mortality rates [5]. The incidence rate of new seizures that appear after the diagnosis of chronic subdural hematoma varies between 3% and 23% [6]. It is not common to observe inaugural epileptic seizure during surgery for CSDH and which continues postoperatively. Postoperative seizures represent between 2.5 [7] and 6% [8] and are associated with high mortality. Therefore, some authors recommend antiepileptic prophylaxis in all patients with CSDH [8]. Two deaths related to status epilepticus were recorded in our study population. Others authors propose in case of postoperative seizures, an antiepileptic treatment for a period of 3 to 6 months. Some authors have reported that the incidence of postoperative seizures was too low to justify the use of prophylactic antiepileptics [10; 11]. Furthermore, a retrospective study of 98 patients had shown no difference in terms of ictal events, regardless of the status of administration of antiepileptic prophylaxis or not [12]. In a study on a series of 164 cases of CSDH diagnosed in 120 patients, Lavergne and al did not find any difference in clinical results at 1 month in patients who had postoperative epilepsy compared to those who did not hadn't. They concluded that antiepileptic prophylaxis does not appear to be effective in preventing epileptic seizures in CSDH cases [1]. However, two retrospective analytical studies of operated patients with CSDH found a lower incidence of seizures when patients received antiepileptic prophylaxis compared to those who did not receive [13; 14]. Increased morbidity and mortality have been recorded in patients with postoperative seizures [13]. Certain conditions have been described as risk factors for epileptic seizure in patients with CSDH. These include a low Glasgow score upon admission (<12) [15], CSDH located on the left side [16], collection of mixed density, as well as a hyper intensity in FLAIR sequence on magnetic resonance imaging (MRI) [17], of a partitioned CSDH, in case of surgical removal of the hematoma membrane (membranectomy), hyponatremia or hypomagnesemia; postoperative clinical deterioration [1]. In our series, 5 patients had partitioned CSDH. The hematoma location was on the left side in 4 cases. The density of the hematoma on CT was mixed in 2 patients. One patient had a Glasgow coma score of 9 when he arrived at the hospital. Convulsive seizures in patients with CSDH are correlated with a significant increase in length of hospital stay and mortality. This leads to a similar increase in the costs of care [18]. In our series, the average length of hospital stay was 9 days (range 6 and 15 days). The inaugural epileptic seizure was complicated by a refractory status epilepticus in 2 patients and led to their death. Two other patients had developed drug-dependent. We share the point of view of certain authors who are favourable to antiepileptic prophylaxis only in the presence of convulsive risk factors [19]. This prophylaxis may begin before surgery and continue up to two or three months postoperatively with clinical and electrophysiological monitoring before stopping the

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medication. In his study, Silhouette B. proposed a treatment duration of 3 to 6 months for patients who had a postoperative seizure [9].

Conclusion

The occurrence of epileptic seizure can seriously complicate the management of chronic subdural hematoma, especially when this inaugural epileptic seizure occurs during surgery or in the immediate postoperative period. Antiepileptic prophylaxis should be discussed in the presence of risk factors. Randomized studies with large cohorts would be necessary to better assess the impact of antiepileptic prevention during the treatment of chronic subdural hematomas.

Conflict of interest

The authors declare that they have no conflict of interest

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Table I : distribution of patients according age, sex and clinical disorders

Patients	**Age** (year)	**Sex**	**Symptômes duration** (days)	**Clinical Signs**	**MARKWALDER Classification**
1	59	M	7	-Glasgow 9 - Right hemiparesia	III
2	71	F	42	-Confusion - Psychomotrice agitation	II
3	75	M	21	- Temporo-spacial desorientation -Left hemiparésia	II
4	79	M	28	-Headache -Right hemiparésia	II
5	81	F	-	- Mental confusion -Left hemiparésia	II
6	80	F	35	- Temporo-spaciale desorientation	II

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7	65	M	22	- Mental confusion -Recurrence falling	II
8	85	M	7	- Langage trouble -Right hemiparésie	II
9	68	M	10	- Temporo-spacial desorientation -Mental slowdown	II

Table II: distribution of patients according the radiologicals characteristics of subdural hematoma in CT-scan.

Patients	**Hematoma localization**	**Siege**	**Hemaoma ply** (millimeter)	**Median line deviation** (millimeter)	**Collection aspects**
1	left	hémisphérique	18,7	7	hypodense with recent hemorrhage
2	bilatéral	hemispheric	right: 10,7 left: 13	-	hypodense

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3	bilatéral	Right frontal Left hemispheric	right: 15 left:7,9	-	hypodense
4	left	hemispheric	19,7	5	hypodense and partition
5	right	hemispheric	20,2	7	hypodense and partition
6	right	frontal	17,9	3	hypodense and partition
7	left	hemispheric	17	4	hypodense and partition
8	left	hemispheric	19,2	4	hypodense with recent hemorrhage
9	right	frontal	18,4	4	hypodense and partition

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Table III: distribution of patients according the type of anesthesia, the surgical technic, the period of installation and the type of epileptic seizures.

Patients	Localisation of hematoma	Siege	Type of anesthesia	Surgical technic	Installation of seizures	Types of seizures
1	left	hemispheric	general	evacuation without drainage	peroperative	generalized seizure
2	bilateral	hemispheric	general	evacuation with drainage	peroperative	generalized seizure
3	bilateral	Right frontal Left hemispheric	general	evacuation with drainage	peroperative	generalized seizure
4	left	hemispheric	local	evacuation with drainage	peroperative	generalized seizure

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5	right	hemispheric	local	evacuation with drainage	postoperative	Partial and secondary generalized seizure
6	right	frontal	local	evacuation with drainage	postoperative	generalized seizure
7	left	hemispheric	local	evacuation without drainage	peroperative and postopérative	partial seizure
8	left	hemispheric	local	evacuation with drainage	peroperative	Partial and secondary generalized seizure
9	right	frontal	local	evacuation without drainage	peropertive and postopérative	generalized seizure

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Figure 1

Brain CT-Scan: right chronic subdural hematoma
A. Axial section: brain compression by left hematoma and subfalcorial engagement

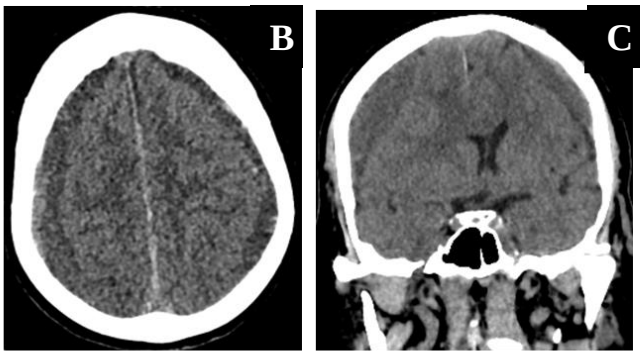

Figure 2:

Brain CT-Scan: bilateral chronic subdural hematoma
B. Axial section: hypodense pericerebral bilateral collection
C. Coronal section: small subfalcorial brain engagement in right side

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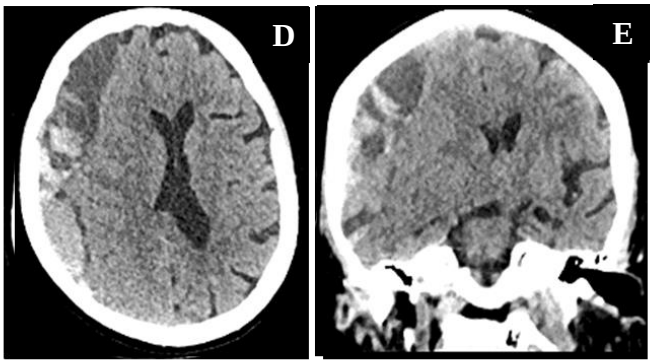

Figure 3:

Brain CT-Scan: right chronic subdural hematoma
D. Axial section: right pericerebral collection with mixed density
E. Coronal section: subfalcorial brain engagement in right side