

CT Findings In Seizure In Subsaharan Africa

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ABSTRACT

Objective: To determine the contribution of CT in the etiological diagnosis of seizures in adults in sub-Saharan Africa.

Patients and Methods: A descriptive retrospective study of a period of twelve months that concerned all patients older than 15 years, in whom was performed a brain computed tomography (CT) for seizures. This study was performed in the radiology department at the University Hospital of Yopougon (Abidjan, Ivory Coast).

Results: The mean age of patients was 42.9 years with extremes ranging from 15 years to 77 years. The sex ratio was 2. Fever was the sign most frequently associated with seizures (23.8%) followed by the post critical coma (19.8%). CT scans were pathological in more than half of the cases (57.1%). The predominant pathologies were meningoencephalitis (20.7%) followed by the cortico-subcortical atrophy (16.7%) and extradural hematoma (16.7%).

Conclusion: Cranioencephalic CT scan showed its diagnostic efficacy in over half of the cases in the assessment of seizures in Abidjan. The etiologies found were dominated by infectious cerebrospinal meningitis pathology. MRI should be popularized in sub-Saharan Africa to go further in this etiological research.

Keywords: Seizures, Cranioencephalic CT scan, Stroke, Brain abscess

INTRODUCTION

Seizures in adults are a common clinical situation. In France, they represent 0.3 to 1.2% of the reasons of admission [3-6] to the emergency unit and the risk in the general population to have seizures is estimated at 5% [3-7]. In the Ivory Coast, they represent 8% of admissions to the intensive care unit according to the studies of BOUH et al. [8].

The diagnostic approach in the presence of seizures in adults is based on a full examination interview, a thorough clinical examination and well oriented additional tests. Medical imaging is an integral part of the diagnostic strategy. It plays a key role. It is represented by computed tomography (CT) and magnetic resonance imaging (MRI). In our African context, apart from epileptic seizures, seizures in adults are a common reason for cerebral CT request. When we know that this examination has a significant cost, it is legitimate to wonder about its real contribution in the etiological research

of seizures in adults. The aim of our study was to determine the contribution of CT in the etiological diagnosis of seizures in adults (epilepsy excluded).

Patients and Methods

This is a descriptive retrospective study which was carried out over a twelve month period from 1 January 2013 to 31 December 2014.

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It concerned all patients in whom it was performed a brain computed tomography (CT) for seizures. This study was carried out in the radiology department at the University Hospital of Yopougon in Northern Abidjan in a popular area called Port-bouet II. Were included, all patients with a complete CT account mentioning (gender, indications, technique of performance and detailed results) and whose age was above 15 years. CT scans were performed on a Toshiba scanner apparatus with 64 bars. A cranioencephalic acquisition in spontaneous contrast was performed with or without another acquisition after injection of iodinated contrast medium according to the case. The parameters studied were age, gender, technical protocol and the results of CT.

RESULTS

All of our results are detailed in **Tables 1, 2 and 3.**

Table 1: Distribution of clinical signs accompanying seizures

Clinical signs	Number	Percentage
Fever	10	23.8%
Post critical coma	8	19.1%
HBP	7	16.7%
Trauma	3	7.1%
Motor deficit	4	9.5%
unspecified	10	23.8%
Total	42	100%

Table 2: Distribution of patients according to CT results

CT Results	Number	Percentage
Normal	18	42.9
pathological	24	57.1
Total	42	100

Table 3: Distribution of pathologies identified on CT scan

Pathologies	Numbers	Percentages
Cortico-sub cortical atrophy	4	16.7
Ischemic stroke	3	12.5
Epidural hematoma	4	16.7

Hydrocephalus	1	4.2
Leukoaraiosis	3	12.5
Tumor process	3	12.5
Meningoencephalitis	5	20.7
Brain abscess	1	4.2
Total	24	100

Forty-two CT scans were performed on the grounds of seizures in adults out of a total of six hundred Cranioencephalic CT scans performed during the study period. This represents an incidence of 7%. The percentage of male subjects is the largest in 66.7% of patients with a sex ratio of 2. There was a predominance of patients aged 25-34 and those aged 55-64 in 23.8% of cases. The average age was 42.9 years with extremes ranging from 15 to 77 years. Fever was the clinical sign accompanying seizures more frequently (23.8%) followed by critical post coma (19.8%). In 76.2% of cases, CT scans were performed with injection of iodinated contrast medium. CT scans were pathological in more than half of the cases (57.1%). The predominant pathologies were meningoencephalitis (20.7%) followed by the cortico-subcortical atrophy (16.7%) and extradural hematoma (16.7%). The other diseases were tumors (12.5%), stroke (12.5%), leukoaraiosis (12.5%), brain abscess (4.2%) and hydrocephalus (4.2%). These different pathologies can be classified into 5 groups that are in decreasing order of frequency: vascular pathology (25%), infectious disease (24.9%), disease sequelae (20.9%), traumatic pathology (16,7%) and tumor disease (12.5%).

DISCUSSION

We performed a Cranioencephalic scanner to all our patients with in 76.2% iodinated contrast medium injection against 24.8% in spontaneous contrast. We agree with the American College of Emergency Medicine [7] that recommends a cranioencephalic scanner for all patients admitted to the emergency department with a first seizure. But the CT protocol depends on the etiology that underlies the occurrence of seizures. It is therefore right that Wilden et al. [8] believe that all cranioencephalic scanners to explore seizures should be first performed without iodinated contrast medium injection in order to exclude fatal bleeding injuries that may require an urgent neurosurgery intervention. Then, according to Sempere et al. [9], another acquisition should also be performed after injection of iodinated contrast medium in HIV infected patients or patients with a history of cancer in order to exclude an abscess or tumor.

In our study, CT scans were pathological in more than half of the cases (57.1%). Our results differ from those of Sudhir [10], in India, in which only 24% of patients had normal exploration. This difference can be explained by the fact that the study of Sudhir included both scanners, MRI, biological

analyzes and EEG while our study was based only on CT. According Esquevin [11], the scanner is limited for the research of hippocampal anomalies, a tumor lesion of small

size or malformation. In all cases, a brain CT scan interpreted as normal does not dispense with the performance of brain MRI.

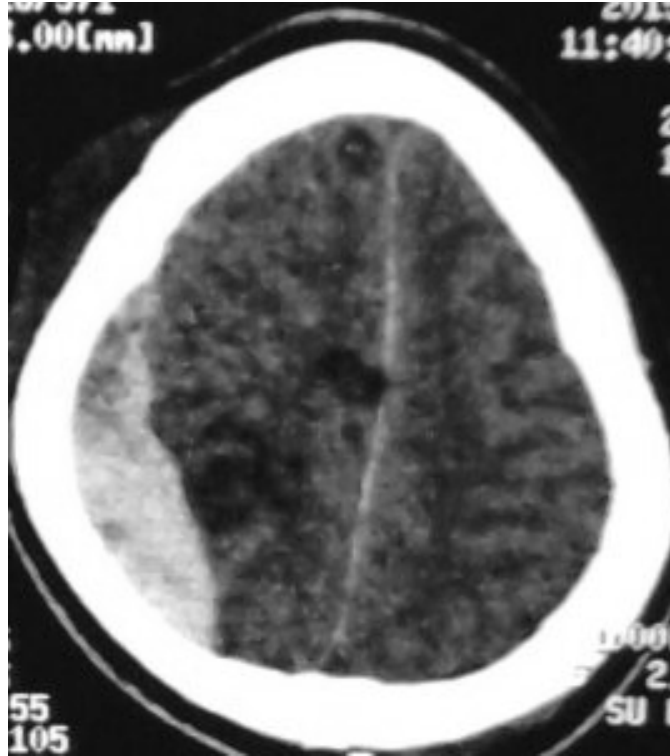


Figure 1. Brain CT performed for convulsive seizures in a 47-year-old patient with a history of trauma. Right frontal extradural hematoma.

The pathologies that we highlighted in the CT exploration of seizures were dominated by meningoencephalitis (20.7%). According Bouh et al. [8], causes of seizures seem to be influenced by the geographical origin or level of development, with a predominance of infectious and vascular causes in sub-Saharan Africa, while in the Western countries alcoholic and drug causes seem more important. Indeed, Mbodj [12] in his work on the management of convulsive status epilepticus in developing countries has found a prevalence of infectious causes (67%). In America, alcohol is among the top three causes of status epilepticus (39%), followed by drug toxicity (14%).

According to some authors [9-14] etiologies can be classified according to age. For these authors, we must distinguish the causes of convulsive seizures in young adults from those in the elderly. In the northern countries, causes of seizures in young adults are dominated by toxic causes (alcoholism, drug intoxication, poisoning energy drinks, etc ...). Lee et al. [13] described in 2015, a case of convulsive seizures in a subject younger than 36 years, a chronic alcoholic with vitamin B6 deficiency. Unlike younger subjects, all Caucasian authors describe tumor and vascular causes, with a predominance of tumor pathology, in subjects

over 60 years [9-14]. In our study, these vascular causes were represented by ischemic stroke and high blood pressure materialized on CT scans by leukoaraiosis lesions. Hemorrhagic strokes were not visualized in our series. If that classification by age should be admitted in sub-Saharan Africa, the causes of seizures in young patients would be dominated by infectious causes and those in the elderly would be dominated by vascular pathology. Indeed, in the study by Ongolo et al. [14] on seizures related to *Toxoplasma meningoencephalitis*, subjects were aged 24, 36, 38, 46 and 58 years. No patient was older than 60 years. In the study of Goita et al. [15] in Mali, that concerned a series of 26 patients, the mean age was 38.1 years, with extremes ranging from 18 to 56 years. Other etiologies such as sequelae pathologies and traumatic pathologies were found in our study. Neishige [16] in Japan reported several cases of subdural hematoma as a cause of seizures. In our study it is rather extradural hematoma. We agree with Duffour et al. [17] who described a case of seizures in connection with an extradural hematoma of vertex in a 36-year-old woman. Sequelae pathologies encountered in our study were brain atrophies and one case of hydrocephalus. Chaudhary et al. [18] reported a case of seizures responsible for hydrocephalus. Metabolic causes of seizures and

alcoholic poisoning have not been found in our study. Unlike Bouh et al. [8] who showed metabolic causes in

13.7% of cases. This could be explained by the fact that our study did not include biological data.

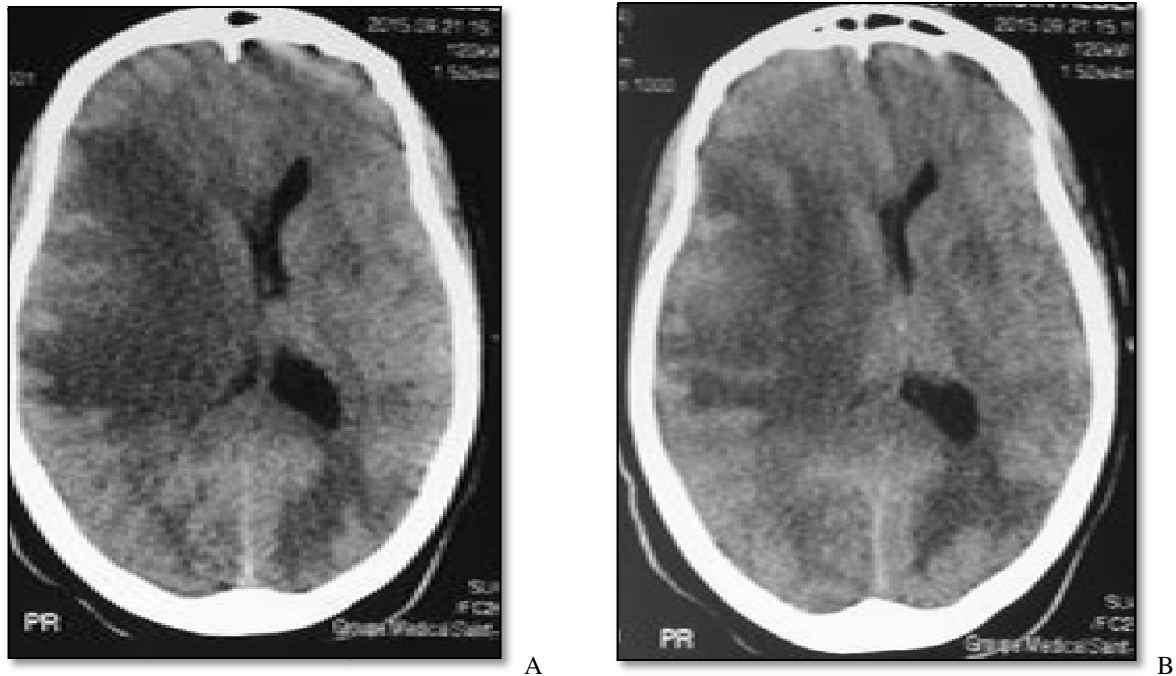


Figure 2. Brain CT in axial sections. A (without IV) and B (after IV): convulsive seizures in a 47- year-old woman with fever and a notion of HIV /AIDS. The brain CT shows a large vasogenic edema taking discreet contrast (pre-suppurative encephalitis)

CONCLUSION

Convulsive seizures are rarely explored in a radiology department. They represented 7% of reasons for the performance of cranioencephalic scanner. They affected predominantly men and were accompanied by fever in most cases. Cranioencephalic scanner that is to be performed mostly without and after contrast injection showed its diagnostic efficacy in more than half of the cases. The etiologies found were dominated by vascular pathology in the elderly followed by infectious diseases in young subjects unlike studies carried out in Western countries where toxic causes are predominant in young subjects and tumor causes in the elderly. Given our results, MRI exploration and a toxicological assessment associated with a well conducted interview should complement the scanner that should keep its place in an emergency unit.

CONFLICT OF INTEREST

None.

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