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Post-Stroke Epileptic Crises: Profile of Patients at Brazzaville Chu

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Abstracts: Epilepsy and cerebrovascular accident (stroke) are two common conditions in neurology, the frequency of which increases with age. One of the most common comorbidities after a stroke is epilepsy; nearly 10% of stroke patients will have a seizure immediately or later. The aim of study was to describe the epidemiological, clinical, electrical and evolutionary aspects of post-stroke crises at the Brazzaville University Hospital. This was a cross-sectional study carried out from March 1 to September 30, 2018 in the neurology department of the University Hospital of Brazzaville. It focused on patients over 18 years of age hospitalized for a seizure following a stroke documented by imaging. The epidemiological, electroclinical and therapeutic variables were evaluated. 322 patients hospitalized for stroke, 62 (15.5%) presented with seizures following the vascular event. Men were more affected (57%). The median time to onset of seizures was 2478 days (6.8 years) after stroke. These attacks were early in 69.4% of cases, and most often focal (37.1%). The epileptic seizures were related to the arterial infarctions in 79% of the cases and the abnormalities found on the EEG tracing were consistent with the location of the vascular lesion in 63.6% of the cases. The death rate was 14.5%. The predictive factors of this mortality were: the late onset of epileptic seizures ($p=0.048$), the presence of hyperglycemia ($p=0.006$) and the absence of a return to a normal state of consciousness ($p<0.001$). Post-stroke epileptic seizures are frequent in our region. Secondary prevention of stroke would help reduce the occurrence of strokes and therefore epileptic seizures

Keywords: Epileptic Seizures, Stroke, Brazzaville University Hospital

1. Introduction

Epilepsy and cerebrovascular accident (stroke) are two common pathologies in neurology, the frequency of which increases with age [1, 2]. One of the most common comorbidities after a stroke is epilepsy; nearly 10% of patients with stroke will present with an epileptic seizure immediately or later [3]. Stroke accounts for 11% of symptomatic epilepsies in adults, and beyond the age of 60, it is the leading cause of epilepsy (33%) ahead of degenerative diseases, brain tumors and head trauma [3, 4]. Post-stroke seizures are divided into two categories; early or late [5]. Early seizures or “acute symptomatic seizures” are not synonymous with epileptic disease [5, 6]. It is more often an

occasional attack, usually occurring within the first 24 - 48 hours, or even the first 7 days after the stroke [5-7]. Their frequency varies from 2 to 33%. Late epileptic seizures occur beyond the seventh day post-stroke, with a frequency of 3 and 67% [5]. In Africa, little data is available on epileptic seizures secondary to stroke. In Congo, published studies on stroke and epileptic seizures have not specifically incorporated this association. Thus, the objective of this work was to determine the frequency and the epidemiological, clinical, electrical and evolutionary profile of post-stroke crises at the Brazzaville University Hospital.

2. Methodology

This current study took place at the University Hospital of Brazzaville (CHUB) in the neurology department and its neurovascular intensive care unit (NICU). The CHUB neurology service is the only service specializing in the management of neurological conditions in adults in Brazzaville. This was a cross-sectional study conducted over the period from March to September 2018, i.e. seven (07) months. It concerned all patients hospitalized in the neurology department and the NICU of the CHUB for epileptic seizures and / or stroke. Were included, all patients hospitalized for at least one epileptic seizure following a recent or previous stroke, documented by imaging, and whose informed consent was obtained from the patient himself or informing third party, when this the latter was unable to speak for himself. Patients with epilepsy known before the onset of the vascular event or who could not perform an EEG were not included.

Diagnostic criteria The diagnosis of the epileptic seizure was based on the observation of suggestive paroxysmal clinical manifestations confirmed by an EEG recording or only by the presence of paroxysmal abnormalities typical of an epileptic seizure on the EEG, in a patient with an alteration. persistence of consciousness.

The variables under study

The main study variable was the onset of epileptic seizures, defined as early when they occurred within the first 7 days after the stroke or late, beyond this time. The secondary variables were sociodemographic (age, sex, occupation, marital status, socioeconomic level), anamnestic (history of stroke, high blood pressure, head trauma, diabetes, alcohol consumption, smoking, heart disease, clinical features of the epileptic seizure and their triggering factors), clinical (NIHSS score on admission, Glasgow score on admission) and progressive (death and associated factors).

Statistical analyzes

They were carried out on SPSS 20.0 software. Categorical variables were expressed in numbers and frequencies and quantitative ones as mean±standard deviations or as median with interquartile range, depending on the extent of the distribution. The comparison of the numbers was carried out by Pearson's Chi-2 test or the Fisher test for small numbers. The comparison of the difference between the means was carried out by Student's t test. The significance threshold was set at 5%.

3. Results

Diagnosis of post-stroke epileptic seizures

During the study period, 322 patients were hospitalized for stroke and 78 patients were hospitalized for seizures. Sixty-two (15.5%) of all these patients had at least one epileptic seizure episode following stroke, i.e. 19.2% of the 332 patients hospitalized for stroke and 79.5% of the 78 patients hospitalized for epileptic seizures.

The median time to onset of seizure compared to stroke was 3 days (0.3-9 days). This period ranged from 0 to 4955 days (or 165.2 months or 13.8 years) after the stroke. We recorded 43 (69.4%) early seizures with a median time to onset of 0.8 days (0-3.4 days) and 19 (30.6%) late seizures with a median time to onset of 16 days (9.5-237.2 days).

Sociodemographic and anamnestic characteristics

The mean age of the patients was 64.7±10.8 years [39-86 years]. Figure 1 illustrates the distribution of patients by age group, with nearly 75.9% in the 60 and over age group. There were 33 men (53.2%) and 29 women (46.8%), with a sex ratio of 0.87.

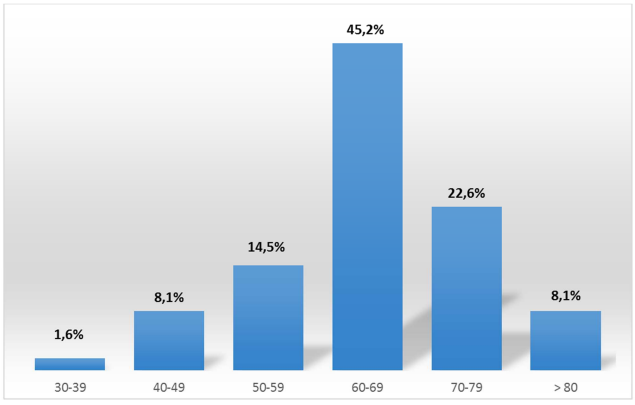

Figure 1. *Distribution of patients by age group (years).*

A history of stroke was found in 24 (38.7%) patients, all of whom had a single previous stroke episode, which was ischemic. In 12 (50%) patients, stroke was left-lateral and in 12 (50%) it was right-lateral. Heart disease was found in 8 (12.9%) patients, in 5 (62.5%) patients it was embologenic and in 3 (37.7%) non-embologenic.

The other medical histories found were high blood pressure (n=61; 98.4%), diabetes mellitus (n=19; 30.6%), smoking (n=09; 14.5%) and drinking. alcohol (n=08; 12.9%).

Clinical and electrical features of epileptic seizuresThe mean number of epileptic seizures was 2.6±1.6 [1-8] with an approximate mean duration of 7.5±6.3 minutes [0.5-20 minutes]. They recurred in 40 (64.5%) patients. Tables 1 present the clinical characteristics of epileptic seizures.

Table 1. *Clinical characteristics of epileptic seizures.*

Clinical data	n	%
Type of event		
Clonic	27	43,5

Clinical data	n	%
Tonicoclonic	18	29,0
Myoclonic	14	22,6
Loss of consciousness	03	04,8
Triggering Factors		
Fever	03	04,8
Insomnia	03	04,8
Stress	02	03,2
Unspecified	54	87,1
Laterality		
Widespread	18	29,0
Left focal lenghts	12	19,4
Left focal lenghts whith bilateralization	12	19,4
Straight focal lenghts	11	17,7
Straight focal lenghts with bilateralization	06	09,7
Unknown	03	04,8

Of the 62 patients included in this study, 27 (43.5%) had EEG abnormalities and 35 (56.5%) had normal EEG recording. Focal EEG abnormalities were right lateralized without bilateralization in eight (29.6%) and with bilateralization in five (18.5%) patients. Those lateralized to the left without bilateralization represented 18.5% (n=5) and with bilateralization 22.2% (n=6). Table 2 presents the elements relating to the EEG recording methods and the electrical characteristics of the recorded patterns.

Table 2. *EEG data.*

	n	%
Achievement period		
Intercritical	33	53,2
Critical/postcritical	29	46,8
Type of anomalies (n=27)		
Non epileptiform	02	07,4
Epileptiforms	25	92,6
Laterality of abnormalities (n=27)		
Focal	24	88,9
Bilateral	03	11,1

Characteristics of stroke and correlation with epileptic seizures

Brain CT was performed in 57 (91.9%) patients and MRI in 5 (8.1%) patients. It was ischemic stroke in 49 (79%) patients, hemorrhagic stroke in 12 (19.4%), and ischemic stroke with hemorrhagic change in one patient (1.6%).

Brain imaging demonstrated recent lesion in 54 (87.1%) patients with a median time to onset of 2 days (0.2-7.2 days). Sequelae lesions in 29 (46.8%) patients with a median time to onset of seizures of 3.8 days (0.6-66.5 days). In 21 (33.9%) patients, multiple lesions were found with a mean of 1.8±1.5 lesions [1-9 lesions].

Among the 54 patients with a recent lesion objectified by imaging, 21 (38.9%) also had multiple sequelae and 33 (61.1%) no sequelae lesion. Eight (27.6%) of the 29 patients with a sequelae-looking lesion on imaging had only one lesion.

The arterial territory affected was that of the middle cerebral artery in 48 (77.4%) patients, including 41.7% (n=20) where the involvement was lateralized on the left, 37.5% (n=18) on the right and 20.8% (n=10) bilateral. Impairment on the posterior cerebral artery territory was found in ten (16.1%) patients, including 20% (n=2) on the left, 60% (n=6) on the right and 20% (n=2) bilateral. Involvement in the territory of the anterior cerebral artery in four (6.5%) patients, including 25% (n=1) on the left, 25% (n=1) on the right, 50% (n=2) bilateral. The vertebral basilar territory involvement concerned three (4.8%) patients.

The epileptic seizures occurred in 78% (n=53) of cases with a cortical lesion, 8.1% (n=5) with a subcortical lesion and 6.5% (n=4) with a corticosteroid lesion-cortical. Comparison between early and late seizures based on socio-demographic, anamnestic, and imaging characteristics. Tables 3, 4 and 5 summarize the comparison between early and late seizures according to the different data.

Table 3. *Comparison between early and late seizures according to socio-demographic characteristics.*

Sociodemographic characteristics	Early seiures (n=43)	Late seizures (n=19)	*p*
	n (%)	n (%)	
Age (years)	63,8±11,6 [39-85]	66,8±8,3 [54-86]	0,244
Sex			
Male	25 (58,1)	08 (42,1)	0,243
Female	18 (41,9)	11 (57,9)	
Profession			
Public sector	-	01 (05,3)	
Private sector	04 (09,3)	01 (05,3)	
Informal sector	17 (39,5)	09 (47,4)	0,484
Unemployed	07 (16,3)	01 (05,3)	
Retired	15 (34,9)	07 (36,8)	
Marital status			
Married	14 (32,6)	04 (21,1)	
Single	03 (07,0)	02 (10,5)	0,191
Married life	20 (46,5)	06 (31,6)	
Widowed	06 (14,0)	07 (36,8)	
Socioeconomic level			
Very low	03 (07,0)	02 (10,5)	
Low	18 (41,9)	08 (42,1)	
Medium	15 (34,9)	07 (36,8)	0,928
High	07 (16,3)	02 (10,5)	

Table 4. *Comparison between early and late seizures according to history.*

History	Early seizures (n=43)	Late seizures (n=19)	*p*
	n (%)	n (%)	
Stroke	15 (34,9)	09 (47,4)	0,352
High Blood Pressure	43 (100)	18 (94,7)	0,306
Diabetes mellitus	16 (37,2)	03 (15,8)	0,092
Heart disease	05 (11,6)	03 (15,8)	0,692
Smoking	07 (16,3)	02 (10,5)	0,709
Alcohol	06 (14,0)	02 (10,5)	1,000

Table 5. *Comparison between early and late attacks according to the imaging data of the current stroke.*

Imagery data	Early seizures (n=43)	Late seizures (n=19)	*p*
	n (%)	n (%)	
Number of lesions	1,9±1,7 [1-9]	1,6±0,8 [1-3]	0,274
Type of stroke			
Ischemic	33 (76,7)	16 (84,2)	
Haemorrhagic	10 (23,3)	02 (10,5)	0,205
Ischemic with hemorrhagic rearrangement	-	01 (05,3)	
Topography of stroke			
Cortical	35 (81,4)	18 (94,7)	0,519

Imagery data	Early seizures (n=43)	Late seizures (n=19)	*p*
	n (%)	n (%)	
Sub cortical	04 (09,3)	01 (05,3)	
Cortico under cortex	04 (09,3)	-	
Stroke size			
Less than ⅓	03 (07,0)	02 (21,5)	
Between ⅓ and ½	15 (34,9)	07 (36,8)	0,828
Between ½ and ⅔	07 (16,3)	04 (21,1)	
Other ⅔	18 (41,9)	06 (31,6)	
Recent injury	41 (95,3)	13 (68,4)	0,008
Sequelae	18 (41,9)	11 (57,9)	0,243
Multiple lesions	16 (37,2)	05 (26,3)	0,403

4. Discussion

In the literature, the frequency of post-stroke epileptic seizures varies from 5 to 20% at all ages [5]. In Cotonou, Adoukonou Thierry et al reported an incidence of 17% [8]. Our study found a frequency of 19.5%. However, our results are superior to the Mansouri study in Morocco [9] which reports a frequency of 9.2% of post-stroke attacks. The large size of their population as well as the retrospective nature of their study could explain this lower frequency. In addition, in Douala, Cameroon, in 2015, Kuate-Tegueu et al indicated that stroke was the leading cause of epilepsy in people aged 60 and over and was the main etiology of patients hospitalized for epileptic seizures. in the adult population [10]. This finding was also confirmed in our study where stroke accounted for 79.5% of hospitalizations for epileptic seizures.

We recorded 69.4% early seizures and 30.6% late seizures. Our results are similar to those reported by Labovitz et al. [11]. In Morocco, Mansouri et al [9] found 56% of early seizures and 44% of late seizures, respectively, for which the time to onset was set beyond 14 days. It is currently established that the cut-off time for defining early or late seizures after stroke is seven days, and late seizures are currently defined as vascular epilepsy [5]. The different consideration of the definition of vascular epilepsy explains the differences in frequency observed in several studies [12, 13]. The Oxfordshire Community Stroke Project reports that the incidence of post-stroke seizures increases dramatically with advancing age, with a male predominance [14]. Daou, Mali, in a study of epilepsy in subjects over 50 years of age, reported a 64.1% frequency of stroke-related seizures [15]. The peak frequency was 45.2% in our study between 60 and 69 years, with 75.9% of patients aged 60 and over and a mean age of onset for all patients of 64.7 years. This age is similar to that found in other African studies [9, 12, 13, 16]. A male predominance was also observed in our study, as in various African studies [8, 12, 13].

No statistically significant difference for the age and sex of the patients was found between the onset of early and late seizures (respectively, p=0.244 and p=0.243).

High blood pressure (98.4%) was the main cardiovascular risk factor found in our study, followed by diabetes mellitus (30.6%), the notion of smoking (14.5%) and alcoholism (12.9%). Our results overlap with those reported in the Moroccan study, where hypertension was the main cardiovascular risk factor, followed by diabetes, smoking and alcoholism [9]. Indeed, these are above all the risk factors most implicated in the onset of stroke [5, 17]. However, their incrimination in the occurrence of epileptic seizures has not been established.

In agreement with the data in the literature, our study found 37.1% of focal seizures and 29.1% of focal seizures with bilateralization [5, 17]. Generalized seizures were observed in 29% of cases. In Benin, focal seizures were also more frequent (74.3%), followed by bilateral focal seizures (14.3%) then generalized seizures (5.7%) [8]. This observation was also found in Dakar [16]. However, Millogo in Burkina Faso reports a higher frequency of generalized crises (53.1%), which would be more easily spotted by those around them [18].

According to the literature, EEG is abnormal in the acute phase of stroke [5, 15, 17]. In our study, EEG was abnormal in 43.5%, with 92.6% epileptiform abnormalities and 7.4% non-epileptiform abnormalities. The majority of our patients had an ischemic stroke (79% cases) as evidenced by several authors [12, 13, 16, 18]. Cortical topography was predominant in 78% of cases, because it is the predictive site of post-stroke seizures according to the literature, 81.6% found in Morocco [5, 9]. Also the hemorrhagic transformation of an ischemic lesion is considered as a risk factor for the onset of an early crisis after stroke [19-21]. Moreover, early seizures were more frequently associated with the existence of a recent lesion on imaging (p=0.008).

The mortality rate was 14.5% with the main factors being the precocity of the attacks (p=0.048), hyperglycemia (p=0.006) and above all the lack of improvement in consciousness disorders (p<<0.001). The association between early seizures and a pejorative neurologic course has already been demonstrated [19, 22, 23]. Hyperglycemia is considered to be a poor prognostic factor in stroke in general, and perhaps even more so in the presence of seizures [24-26].

5. Conclusion

Post-stroke epileptic seizures are the main etiology of patients hospitalized for epileptic seizures, and quite common among those admitted for stroke. They are more often early than late, with a peak in frequency between 60 and 69 years, and associated with a more severe alteration of consciousness and neurological handicap on admission. They are more often focal seizures, consistent in the majority of cases with the abnormalities observed on EEG and vascular lesion, more often cortical and ischemic, objectified on brain imaging. Early detection of attacks should be systematic in the acute phase of a stroke, especially in the face of persistent disturbances of consciousness, as well as control of blood sugar levels and other secondary worsening factors of systemic origin

Conflicts of Interest

All the authors do not have any possible conflicts of interest.

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