Case Report

Post-Stroke Epilepsy : Epidemiological, Electro-Clinical and Therapeutic Aspects at the Loandjili General Hospital in Pointe-Noire, Republic of Congo

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Abstract

Introduction: Post-stroke epilepsy is the leading cause of epilepsy in the elderly. The diagnosis can be difficult in case of non-convulsive manifestations. So-called novel anti-epileptic drugs are more appropriate as low-dose monotherapy. The purpose of this study was to determine the epidemiological, electro-clinical and therapeutic aspects of post-stroke epilepsy in our practice.

Patients and methods: We conducted a cross-sectional study with a descriptive and analytical aim over a period of 12 months. We interviewed, reviewed and consulted records of inpatients during the study period. Chi2, t-student and Anova tests were used for the comparison of variables.

Results: 583 patients were collected. Among them, 46 suffered from Post-stroke epilepsy with a hospital frequency of 7.89%. This epilepsy occurred mostly a year after stroke and predominated in men. It mainly complicated ischemic stroke (95.7%) and manifested itself mainly in the form of generalized tonic-clonic seizures. Status epilepticus was common and was not associated with mortality. Ancient anti-epileptic drugs especially phenobarbital were used with excellent therapeutic success as low-dose monotherapy. Our patients were mostly hypertensive.

Conclusion: Post-stroke epilepsy is common and of favorable course under antiepileptic drugs. Secondary prevention of hypertension and stroke would reduce the risk of post-stroke epilepsy.

Keywords: Epilepsy; Vascular; Pointe-Noire; Congo.

Introduction

Stroke is the leading cause of epilepsy in older adults [1-5]. Post-stroke attacks occur more after a hemorrhagic stroke [1,5]. The International League Against Epilepsy (ILAE) classifies seizures that occur within 7 days of stroke as acute symptomatic seizures [6]. These increase the risk of vascular epilepsy by 10 - 20% [7-9]. Conversely, seizures occurring more than 7 days after a stroke are defined as vascular epilepsy. Vascular seizures can be separated into very early (< 48 hours), early (< 2 weeks) and late (> 2 weeks) seizures [10]. Hemorrhagic lesions cause a proportionately high number of early attacks [10]. Cerebrovascular lesions put you at increased risk of seizures and epilepsy [11]. The risk of early seizure is higher for lobar haemorrhage than deep bleeding [12]. But the occurrence of epileptic seizures has sometimes been described in cases of deep infarction. [11]. The diagnosis can be difficult in case of non-convulsive seizures (psychomotor agitation, contact breakdown, memory problems, ...) [9].

The EEG is one of the very remarkable diagnostic contribution but its normality does not exclude the diagnosis because it is only rarely contributory [13]. The main signs found are the overloaded

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focal slowdowns or not the tips. Generalized paroxysmal abnormalities are rare [13].

Because of their improved tolerance, newer ant-iepileptic drugs such as levetiracetam and lamotrigine are the most widely used to prevent seizures [5,13].

Vascular epilepsy usually progresses favorably with low-dose antiepileptic monotherapy [13].

Studies on vascular epilepsy are rare in our country, hence we conduct this study in order to describe its epidemiological and electro-clinical aspects in a specific way
- Determine the hospital frequency of vascular epilepsy
- Describe the semiology of vascular crises
- Determining factors associated with vascular epilepsy
- Determine therapeutic modalities for vascular epilepsy
- Determine the progressive modalities of vascular epilepsy

Patients and Methods

Study framework: Our study took place at Loandjili General Hospital, specifically in the neurology department.

Type of study

This was a retrospective cross-sectional study, with descriptive and analytical purposes.

Study period: it took place from June 15, 2021 to May 15, 2022, i.e. for a period of one year.

Study population

Our study involved all patients who were hospitalized for seizure after stroke during the study period. It is a reference center and the only hospitalization service for neurological pathologies with a sub-regional vocation (Cabinda).

Inclusion criteria

All patients admitted for seizures or seizures after stroke were included in the study.

Non-inclusion criteria

Patients for whom records lacked crucial information and those who had epilepsy since childhood were not included in our study.

Study variables

Study variables were : age, sex, marital status, history, number of episodes, time to first seizures, type of seizures, associated signs, therapeutic and progressive modalities.

Methods

We carried out a systematic selection of patients who met the selection criteria. We prepared a collection sheet to facilitate the collection of data on medical records and by interviewing patients before recording them on an Excel sheet.

Collection techniques and tools

We used a card to collect the data before saving it to an Excel sheet to facilitate its processing and analysis

Statistical analysis plan:

Khi2, t-student and Anova tests were used to correlate and compare results

Ethical considerations

We obtained free and informed consent from patients to interview them. Respect for human dignity and anonymity was observed.

Results

During the period from June 15, 2021 to May 15, 2022, 583 patients were hospitalized.

Among them, 46 patients had post-stoke epilepsy, representing a hospital prevalence of 7.89%.

Socio-demographic characteristics

Our patients were on average aged 62.83 years ±12,478 years with a median of 64 years and the extremes of 17 and 87 years.

27 patients were male (58.7%) and 19 female (41.3%), a sex ratio of 1.42.

Our patients were mostly married (56.5%).

Socio-demographic characteristics are shown in table 1.

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Socio-demographic parameters	Min	Average	Standard deviation	Median	Max
Age (years)	17	62,83	12,478	64	87
	Man	female	Sex ratio (M/F)		
Sex	27 (58,7%)	19 (41,3%)	1,42		
	Married	bachelor	Widower		
Marital status	26 (56,5%)	10 (21,7%)	10 (21,7%)		
	Retired	Informal sector	housewife	Official	No profession
Profession	16 (34,8%)	12 (26,1%)	8 (17,4%)	2 (4,3%)	8 (17,4%)

Table 1: Socio-demographic parameters.

Clinical features

Our patients were mostly hypertensive (93.5%). Diabetics accounted for 15.2%. The background is shown in table 2.

They had generalized tonic-clonic seizures in 54.30% of patients followed by tonic-clonic focal seizures (26.10%). Generalized tonic seizures and non-convulsive seizures such as visual hallucination and brief loss of consciousness were rare. A statistically significant association was found between diabetes and seizure type (P = 0.020).

Figure 1 shows the different types of seizures observed in our patients.

Background	Yes	No
Arterial hypertension	43 (93,5%)	1 (6,5%)
Diabetes	7 (15,2%)	39 (84,8%)
Impaired consciousness	21 (45,7%)	25 (54,3%)

Table 2: Breakdown by background /state of consciousness.
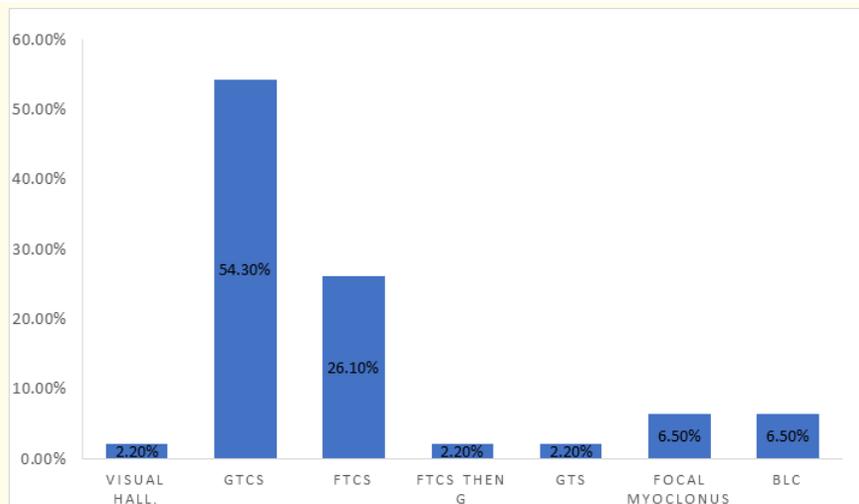

Figure 1: GTCS: Generalized Tonic-Clonic Seizures; FCTS: Focal Tonico-Clonic Seizures; GTS: Generalized Tonic Seizure; BLC: Brief Loss Of Consciousness

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These seizures occurred one week after a stroke in 15.2% of patients, one month after in 2.2%. Most patients experienced their first seizure one year after stroke in 32.6% of patients. The different time taken to onset seizures after stroke is illustrated in figure 2.

These strokes were ischaemic in 95.7% of patients and hemorrhagic in 4.3% of patients.

This was a first episode of vascular crises in 57% of patients, a second episode in 41% and a 3rd episode in 2%.

Disorders of consciousness were noted in 45.7% of patients and 54.3% had normal consciousness. See table 2.

Status epilepticus was objectified by prolonged or recurrent seizures with altered state of consciousness was noted in 46% of patients. High blood pressure and diabetes were not associated with vascular epilepsy severity. Thus, the existence of a disorder of consciousness was not correlated with hypertension (P = 0.461) or diabetes (p = 0.143). See figure 3.

The associated signs were: tongue bite in 13% of patients and sphincter relaxation in 39.9% of patients. Hemibody motor deficit
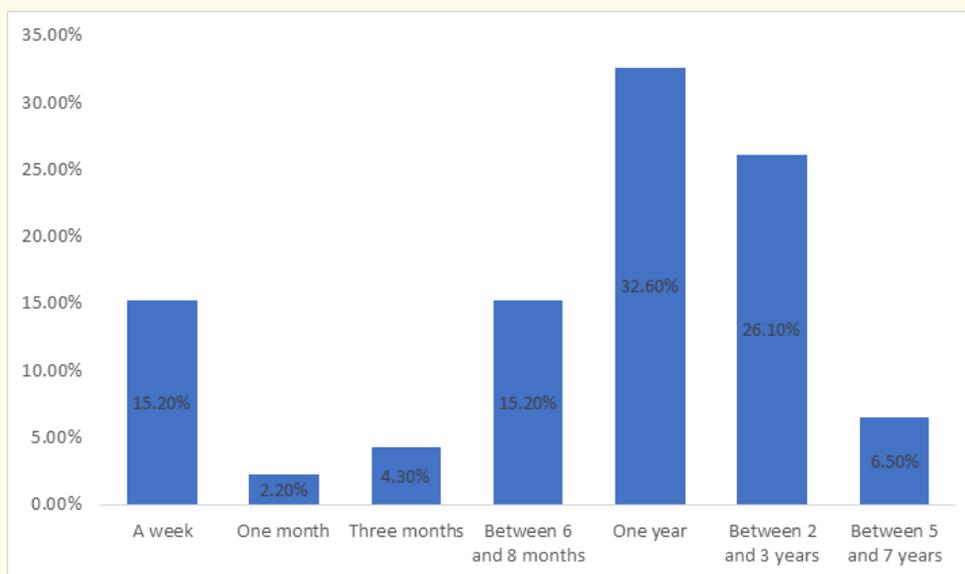

Figure 2: Time to onset of vascular epilepsy.

Figure 3: Severity of seizures.

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is associated in 34.8% of patients on the right and 39.1% on the left. Visual impairment was present in one patient (2.2%). See table 3.

Electroencephalographic characteristics

EEG was only available in 3 patients (6.5%). It was abnormal in 2 of them. This was a focal slowdown of the background rhythm overloaded with unilateral temporo-occipital peaks.

Therapeutic modalities

Anti-epileptic drugs were the main therapeutic modality used in our patients. Phenobarbital was the most used (76%) followed by carbamazepine (13%). Anti-epileptic drugs are shown in figure 4.

Evolutionary modalities

In the majority of our patients (95.7%), seizure remission was achieved with the anti-epileptic drug used. However, 2 patients died (4.3%).

	Right Hemibody	**Left Hemibody**	**bilateral**	**Visual**	**absent**
Deficit	16 (34,8%)	18 (39,1%)	6 (13%)	1 (2,2%)	5 (10,9%)
	Aphasia	Dysarthria	Absent		
Language disorders	4 (8,7%)	5 (10,9%)	37 (80,4%)		
	Present	Absent			
Tongue bite	6 (13%)	40 (87%)			
	Yes	No			
Sphincter relaxation	18 (39,9%)	28 (60,9%)			

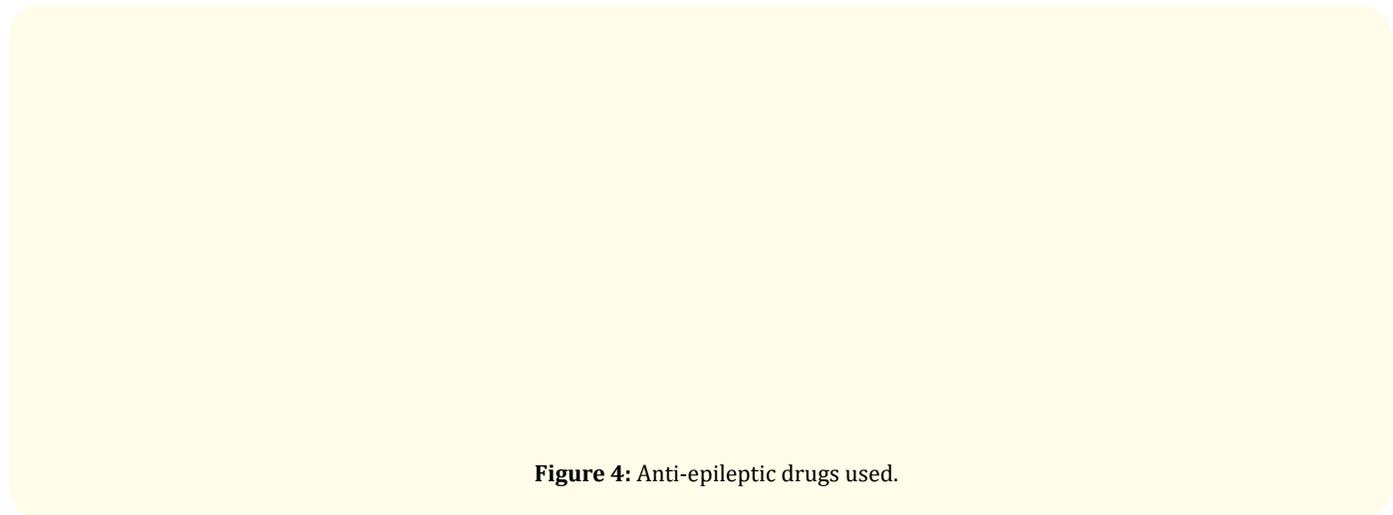**Table 3:** Signs associated with seizures.

Figure 4: Anti-epileptic drugs used.

These deaths did not belong to the ill group and were not statistically due to the existence of a state of ill disease (P = 0.290).

Discussion

Vascular epilepsy is common and is the leading cause of epilepsy in the elderly [1,3,4,11]. Our hospital frequency of vascular epilepsy was high (7.89%). The high frequencies have also been observed by other African studies [3,4,14]. The risk of epilepsy appears to be higher after a late first seizure (54-66%) than in the case of an early seizure (about 30%) [15]. It was much lower (13 per thousand) in Mujtaba Hassani's study [16]. This difference is due to the difference in methods. In our study, like other African studies, it was a question of hospital frequency. Our patients averaged ages were 62.83 years ± 12,478 years with a median of 64

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years and the extremes of 17 and 87 years. Older ages have been observed in Senegal [3]. The age of 72 years obtained in this study was due to the extremes established (60 and 94 years).

The male predominance (sex ratio 1.42) found in our study is the rule in several studies [14,17]. However, female predominances have been observed in the literature [3]. This difference could be explained by the male predominance of strokes. Our patients were mostly hypertensive. This finding has been observed by several authors [3,4,14]. This high frequency of hypertension could be explained by the fact that it is the main risk factor for stroke. Also, the existence of hypertension was a predictor of post-stroke epilepsy [18]. In our serie, generalized tonic-clonic seizures were the most encountered with 54.30%, followed by tonic-clonic focal seizures (26.10%). This predominance of generalized seizures is rare in this age group since focal seizures are the frequent in several studies [3,14,17,19].

This predominance of generalized seizures can be explained by the difficulty of recognizing the focal onset, often due to a lack of reliable controls or by the existence of memory disorders common at this age [3].

The rarity of non-convulsive manifestations could be explained by the lack of knowledge of the particularities of epilepsy in the elderly by doctors. Most patients experienced their first seizure one year after stroke in 32.6% of patients. This observation corroborates the literature. Thus in Gerhard J Jungehulsing's study, most patients had seizures 2 years after epilepsy [18]. These strokes were ischaemic in 95.7% of patients and hemorrhagic in 4.3% of patients. The prevalence of ischemic stroke has been found in the literature [3]. However, according to several studies, hemorrhagic strokes are more likely to cause epilepsy [9-11]. Disorders of consciousness were noted in 45.7% of patients and 54.3% had normal consciousness. Alertness disorders are common and most often witness to a status epilepticus that can go unnoticed in the absence of the EEG [11]. Status epilepticus, defined by prolonged or recurrent seizures with altered state of consciousness was noted in 46% of patients. This high frequency of the status epilepticus is conform with the literature [3,11].

Risk factors were not identified, hypertension and diabetes were not associated with vascular epilepsy severity.

The rarity of tongue bite has been observed [3]. This may explain the frequency of edentulous subjects at this age. EEG was only available in 3 patients (6.5%). It was abnormal in 2 of them. This was a focal slowdown of the background rhythm overloaded with unilateral temporo-occipital peaks. These anomalies corroborate the literature [11]. Anti-epileptic drugs were the main therapeutic modality used in our patients. Phenobarbital was the most used (76%) followed by carbamazepine (13%). The use of so-called «ancient» antiepileptic drugs is the rule in more African studies [3,14,17].

Thus, it is likely that most first-generation anti-epileptic drugs, including phenytoin, phenobarbital, sodium valproate and benzodiazepines, are not the most suitable for the treatment of post-stroke seizures, due to their potentially negative impact on functional recovery, their pharmacokinetic profile, including the risk of drug interactions, the risk of side effects, and the lack of evidence of benefit in this population [20]. On the other hand, because of their better tolerance, the new antiepileptic drugs (Lamotrigine, Levetiracetam) should be the most used as in most Western studies [11,19,20]. This underutilization could be explained by their high cost in our practice.

In the majority of our patients (95.7%), seizure remission was achieved with the anti-epileptic drug used. However, 2 patients died (4.3%). These deaths were not statistically due to the existence of a state of ill disease (P = 0.290). The mortality would be largely explained by the brain injury involved but also by complications. Remissions under anti-epileptic monotherapy are the rule in vascular epilepsy, drug-resistant vascular epilepsies being rare [20]. The effectiveness of antiepileptic treatment appears to be better in post-stroke epilepsy than in other symptomatic partial epilepsies [20]. In our study, the prognosis for EME appeared to be good in accordance with the literature [3]. However, immediate prognosis for post-stroke EME with low mortality has been observed [21].

Conclusion

Vascular epilepsy is common and is the leading cause of epilepsy in the elderly. Its hospital frequency was 7.89%. It was more common in ischemic stroke. Generalized tonic-clonic seizures were

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more frequent. The old antiepileptic drugs used have been associated with a good clinical course with fewer side effects. Secondary prevention of hypertension and stroke would reduce the risk of vascular epilepsy.

Conflict of Interest

The authors claim not to have any conflict of interest and each author has participated in the development of the document.

Bibliography

1. Ru Lin., *et al*. "Risk of Post-stroke Epilepsy Following Stroke-Associated Acute Symptomatic Seizures". *Frontiers in Aging Neuroscience* (2021).

2. Tomotaka Tanaka and MasafumiIhara. "Épilepsie post-AVC". *Neurochimie International* 107 (2017): 219-228.

3. NGASSAKI Saurel Ralmach., *et al*. "EPIDEMIOLOGICAL AND EVOLUTIONARY ASPECTS OF EPILEPSY IN THE ELDERLY IN SUBSAHARAN AFRICA CASE OF SENEGAL". *International Journal of Science Academic Research* 02.06 (2021): 1639-1643.

4. Sounga Bandzouzi Prince Eliot Galieni., *et al*. "Post-Stroke Epileptic Crises: Profile of Patients at Brazzaville Chu". *Clinical Neurology and Neuroscience. Flight* 4.3 (2020): 66-70.

5. Marian Galovic., *et al*. "Seizures and Epilepsy After Stroke: Epidemiology, Biomarkers and Management". *Drugs and Aging* 38 (2021): 285-299.

6. Beghi E., *et al*. "Recommendation for a definition of acute symptomatic seizure". *Epilepsia* 51 (2010): 671-675.

7. Hesdorffer DC., *et al*. "Is a first acute symptomatic seizure epilepsy? Mortality and risk for recurrent seizure". *Epilepsia* 50 (2009): 1102-1108.

8. LanqingZhao and JinweiLiand. "Impact du traitement médicamenteux et des interactions médicamenteuses dans l'épilepsie post-AVC". *Pharmacologie and Thérapeutique* 233 (2022): 108030.

9. Quirins, M., *et al*. "Epilepsy after stroke: Definitions, problems and a practical approach for clinicians". *Revue Neurologique* (2018).

10. P Arnold J., *et al*. "Crises épileptiques après accident vasculaire cérébral (AVC): un essai de mise au point". *La lettre du Neurologue* 6 (2001).

11. C Lamy. "Épilepsie et accident vasculaire cerebral". *Revue Neurologique* 164 (2008): 841-845.

12. Labovitz DL., *et al*. "Prevalence and predictors of early seizure and status epilepticus after first stroke". *Neurology* 57 (2001): 200-206.

13. Tanaka T and Ihara M. "Post-stroke epilepsy". *Neurochemistry International* 107 (2017): 219-228.

14. Kamadore Touré., *et al*. "Epilepsie post-avc chez des patients âgés de 60 ans et plus admis à la Clinique neurologique du CHU de Fann, Dakar Sénégal". *African and Middle East Epilepsy Journal* (2017).

15. Bladin CF., *et al*. "Seizures after stroke: a prospective multicenter study". *Archives of Neurology* 57 (2000): 1617-1622.

16. Mujtaba Hassani., *et al*. "Post-stroke epilepsy in an ischemic stroke cohort-Incidence and diagnosis". *Acta Neurologica Scandinavica* 141.2 (2020): 141-147.

17. Callixte Kuate-Tegueu and Jacques Doumbe. "Les Épilepsies du Sujet Âgé: Aspects Épidémiologiques dans deux Centres de Santé Urbains de la Ville de Douala (Cameroun)". *HEALTH SCIENCES AND DISEASE* 16.2 (2015).

18. Gerhard J Jungehulsing., *et al*. "Incidence and predictors of post-stroke epilepsy". *Acta Neurol Scand* 127.6 (2013): 427-430.

19. Ferro JM and Pinto F. "Poststroke epilepsy: epidemiology, pathophysiology and management". *Drugs Aging* 21 (2004): 639-653.

20. Ryvlin P., *et al*. "Optimizing therapy of seizures in stroke patients". *Neurology* 67 (2006): S3-9.

21. Velioglu SK., *et al*. "Status epilepticus after stroke". *Stroke* 32 (2001): 1169-1172.