


Research Article

# Epidemiological, Clinical and Radiological Profiles of Post-stroke Aphasia in Neurology in Abidjan from April to September 2022

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## Abstract

**Background and purpose:** Aphasia is a language disorder that frequently occurs after a cerebrovascular accident. This prospective descriptive study aimed to describe the epidemiological, clinical and radiological profiles of post-stroke aphasia. **Materials and method:** Patients presenting aphasia after a stroke documented by brain imaging, hospitalized from April to September 2022 in the neurology departments of the Cocody and Treichville University Hospitals were included. Aphasia was screened using the Language Screening Test (LAST). Epidemiological, clinical and radiological data were collected through clinical observation. **Results:** Of the 217 stroke patients admitted to neurology during the period, 32 presented aphasia (14.7%). The average age was 56 years, with a male predominance (M/F sex ratio of 2.2). The majority of patients had primary or no schooling (87.5%). Arterial hypertension was the most frequent cardiovascular risk factor (50%) and hemiplegia, the most common physical sign (93.8%). The average LAST score for aphasic patients was 5.3 out of 15. We observed that naming and repetition were the most affected components of speaking, with scores below normal in 87.5% and 88% of cases. Regarding oral comprehension, order execution was the component most affected for 75.1% of patients. In the acute phase of stroke, 50% of cases of aphasia were severe. Radiologically, 75% of patients presented an ischemic stroke with the predilection of the middle cerebral artery. **Conclusion:** this study highlights the importance of early detection of aphasia in post-stroke patients and rapid treatment to optimize their linguistic recovery.

## Keywords

Aphasia, Stroke, Language Screening Test (LAST), Epidemiological, Clinical, Radiological Profiles

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## 1. Introduction

Aphasia is the total or partial loss of language, following a lesion in the language areas located in the dominant cerebral hemisphere, generally the left hemisphere. The impairment can then disrupt the various activities that make up language: expression, understanding, reading and writing. However, it does not imply a psychological disorder or intellectual disability [1, 2]. Aphasia is one of the most common post-stroke disabilities [1, 3]. Its consequences are multiple and considerably reduce the quality of life of those affected. It is one of the consequences that often worries victims' relatives, hence the importance of knowing how to detect it early and knowing the sociodemographic aspects, clinical manifestations and radiological aspects of this aphasia. The objective of this study was therefore to describe the epidemiological, clinical and radiological profiles of post-stroke aphasia.

## 2. Methodology

A prospective descriptive study lasting 6 months, from April 1, 2022 to September 30, 2022 was carried out. Patients hospitalized in the Neurology departments of the Cocody and Treichville University Hospitals with language disorder after a stroke confirmed on brain imaging were included. Acute phase assessment was carried out in the department as soon as possible after admission, in most cases within the first week after stroke onset (median 4 days, mean 7.3 days, standard deviation 11.2). Aphasia was screened using a language assessment using a neuropsychological test, the Language Screening Test (LAST) (Appendix). The following parameters were studied:

1. Sociodemographic data and risk factors
2. Clinical data
3. Radiological data

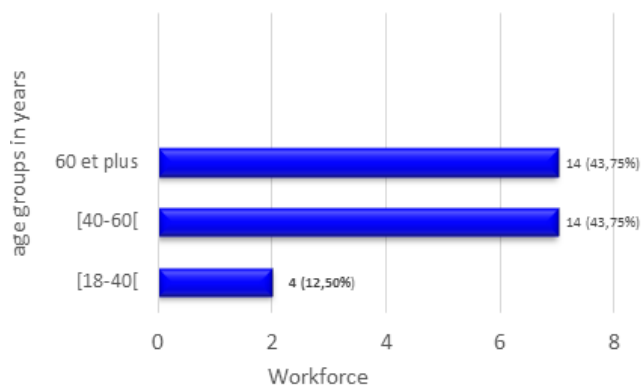
For statistical analysis, chi-square test for qualitative variables and independent t-test for quantitative variables with a probability value of 0.05 defined as statistical significance were used.

## 3. Results

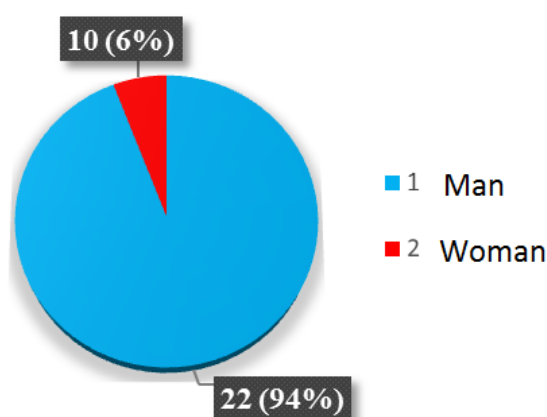
### 3.1. Epidemiological Characteristics

During the study period, 217 patients were hospitalized for stroke.

Including 32 cases of aphasia, with a hospital prevalence of 14.7%. The age of the patients ranged from 35 to 76 years with an average of 56 years (Figure 1). The M/F sex ratio was 2.2 (Figure 2). The majority of patients had primary or no schooling (87.5%).



**Figure 1.** Distribution of post-stroke aphasic patients by age in years.



**Figure 2.** Distribution of post-stroke aphasic patients by gender.

### 3.2. Clinical Features

Clinically, arterial hypertension was the most frequent cardiovascular risk factor (50%) (Table 1), and hemiplegia the most common physical sign (93.8%). (Table 2). Stroke severity in aphasic patients was moderate to severe in the acute phase (Figure 3). The mean LAST score was 5.3 out of 15 (Table 3).

The most affected components of oral expression were naming and repetition, where scores were below normal in 87.5% and 88% of cases respectively. (Table 4) Regarding oral comprehension, command execution was the most affected component (75.1%). (Table 5). In the acute phase of the stroke, aphasia was severe (score = 0-5) in 50% of cases, moderate (score = 6-10) in 25% and mild (score = 11-14) in 25% (Figure 4).

**Table 1.** Distribution of post-stroke aphasic patients according to risk factors.

Risk factors	Number (n)	Percentages (%)
hypertension	16	50,0
diabetes	2	6,3

Risk factors	Number (n)	Percentages (%)
Heart disease	0	0
Dyslipidemia	2	6,3
Obesity	4	12,5
Sedentary lifestyle	2	6,3
Alcohol	6	18,8
Tobacco	4	12,5

**Table 2.** Distribution of post-stroke aphasic patients according to physical signs.

Physical signs	Numbers n	Percentages %
Hemiplegia	30	93,8%
Disorder of consciousness	6	18,8%
Convulsive attack	4	12,5%

**Table3.** Mean LAST score in the acute phase of the stroke.

LAST	Acute phase
Average score	5,3
Median	4
Minimum	0
Maximum	10,3

**Table 4.** Distribution of patients according to the scores of the oral expression components of the LAST in the acute phase.

Variables	N (%)
Denomination score /5	
0	20 (62,5)
1	0
2	6 (18,8)
3	0
4	2 (6,3)
5	4 (12,5)
Repeat score /2	
0	24 (75)
1	4 (12,5)
2	4 (12,5)

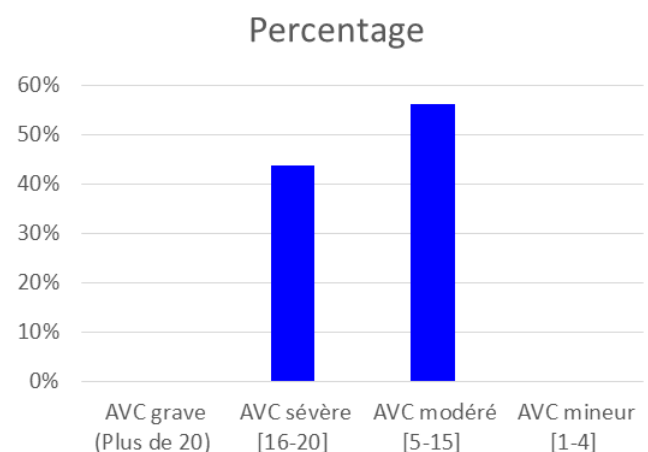
Variables	N (%)
Automatic series /1	
0	20 (62,5)
1	12 (37,5)

Denomination score 5 /5: Normal  
Repeat score 2/2: Normal  
Automatic series 1 /1: Normal

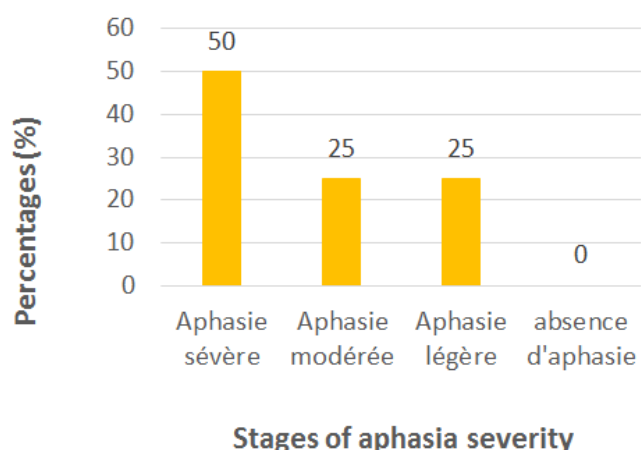
**Table 5.** Distribution of patients according to LAST listening comprehension component scores in the acute phase.

ORAL COMPREHENSION	
Acute phase	
Variables	n (%)
Designation score /4	
0	16 (50)
1	0
2	2 (6,3)
3	2 (6,3)
4	12 (37,5)
Order execution score /3	
0	12 (37,5)
1	2 (6,3)
2	10 (31,3)
3	8 (25)

Designation score 4/4: Normal  
Order execution score 3/3: Normal



**Figure 3.** Distribution of patients according to acute stroke severity.



**Figure 4.** Distribution of patients according to aphasia severity in the acute phase.

### 3.3. Paraclinical Features

Radiologically, ischemic stroke was most common in aphasic patients, with a prevalence of 75%, involving only the middle cerebral artery. In patients with hemorrhagic stroke, the lobar site was predominant (12.5%). (Table 6)

**Table 6.** Distribution of patients according to radiological signs.

Hemorrhagic stroke	4	25,0%
Lobar	2	12,5%
Profound	1	6,3%
Lobar and Profound	1	6,3%
Ischemic stroke	12	75,0%
ACA	0	0%
MCA	12	75%
ChA	0	0%
PCA	0	0%
CbA	0	0%
Total	16	100,0%

## 4. Discussion

The male predominance found in this study is not similar to data in the African literature [4]. The mean age ( $56 \pm 13$  years) is close to that reported by some authors, ranging from 50.6 to 59 years [5, 6]. The majority of patients had a low level of education, with 31% having no schooling and 50% with primary education.

This could be explained either by a recruitment bias, or by the significant presence of low socio-economic populations in public hospitals. In fact, people with no schooling work

mainly in the informal sector, and have no fixed source of income that would enable them to have insurance or even to attend private hospitals [7]. In terms of clinical characteristics, arterial hypertension was the main antecedent with a rate of 50%. However, none of the patients had a history of heart disease, which does not corroborate the findings of some authors who stress that atrial fibrillation represents the highest risk factor for ischemic stroke with aphasia. [4] Such results could be explained by patients' lack of knowledge of their cardiovascular status at the time of acute LAST assessment. Hemiplegia was the most common, with a prevalence of 93.8%. This preponderance was reported by Aka-Anghui Diarra and colleagues in Ivory Coast and by Boubacar Sonfo et al. in Mali [8, 9]. Stroke in aphasic patients was moderate to severe in the acute phase. This is consistent with the literature, which estimates that the mean total NIHSS  $\pm$  SD in ischemic stroke patients with aphasia was significantly higher than in patients without aphasia [4]. This could be justified by the fact that language is a component of the brain's ability to function. Consequently, the more severe the language impairment, the higher the NIHSS Score. Language difficulties concerned both expression and comprehension, as described in the literature [10] Radiologically, ischemic strokes were the most frequent in our study, confirming the data in the literature [8]. The territory of the middle cerebral artery was the most involved in our study, as described in the literature. [11] However, in the case of haemorrhagic strokes, the location of the cerebral haematoma found was lobar, in contrast to studies carried out in the sub-region where the location was deep. [12] This could be due to the small size of our sample. Further studies with larger samples will provide more accurate profiles.

## 5. Conclusion

This study provides valuable information for improving the management of patients with post-stroke aphasia in Abidjan, but also in other similar contexts and geographical regions. Further research is needed to better understand the factors associated with improved language recovery in post-stroke aphasia patients, and to develop effective therapeutic strategies.

## Abbreviations

LAST	Language Screening Test
ACA	Anterior Cerebral Artery
MCA	Middle Cerebral Artery
ChA	Choroidal Artery
PCA	Posterior Cerebral Artery
CbA	Cerebellar Artery
NIHSS	National Institutes of Health Stroke Scale
SD	Standard Deviation

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## Author Contributions

**Beuseize Affou é Marie Roxane:** Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

**Kouassi Kouam é L éonard:** Conceptualization, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft

**Abb é Ange St éphane:** Data curation, Investigation

**Yeo Nawa Samuel:** Methodology

**Essoin-De Souza Nancy Tanya:** Investigation, Data curation, Writing – review & editing

**Broh N'Guessan Yves:** Investigation, Data curation

**Offoumou Fiacre Delors:** Investigation, Data curation

**Diakite Ismaila:** Methodology

**Dombia-Ouattara Mariam:** Methodology; Supervision, Validation, Visualization

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## Data Availability Statement

The data is available from the corresponding author upon reasonable request.

## Conflicts of Interest

The authors declare no conflicts of interest.

## Appendix

**Table 7.** Language Screening Test (last), Oral expression.

Oral expression		SCORE
Name	Pencil	/1
	Television	/1
	Lion	/1
	Knife	/1
	Butterfly	/1
	Score denomination	/5
Repeat	Literature	/1
	Holidaymakers want strawberry ice cream	/1
	score repetition	/2
Automatic series	Counting from 1 to 10	/1
	Automatic series score	/1
Total score for oral expression		/8





Figure 5. Pictures to assess oral expression.

Table 8. Language Screening Test (last), Listening Comprehension.

Listening comprehension		SCORE
Designation	Hat	/1
	Hand	/1
	Car	/1
	Tomato	/1
	Score designation	/4
Order execution	"Show the ground	/1
	"Don't take the leaf, take the key	/1
	"Touch one of your ears with one finger, then your forehead with two fingers".	/1
	Order execution score	/3
Total score listening comprehension		/7
SCORE LAST TOTAL		/15



Figure 6. Pictures to assess Listening comprehension.



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## Biography



**Beuseize Affoué Marie Roxane** is a doctor in her 4th year of internship in neurology at the Yopougon University Hospital, Abidjan, Ivory Coast. She obtained her Doctorat d'Etat en Médecine from the UFR des Sciences médicales de l'Université Félix Houphouët Boigny de Cocody in 2023. She is currently in her 3rd year of the Diploma of Specialized Studies in Neurology. She has taken part in a number of scientific conferences over the past four years, presenting papers on interesting topics in vascular neurology, neuropsychology and neuropsychiatry.

## Research Field

**Beuseize Affoué Marie Roxane:** General neurology, vascular neurology, neuropsychology, epileptology.

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**Yó Nawa Samuel:** General neurology, peripheral neuropathy, sexual health.

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