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Posterior Fossa Strokes at UTH Kara (Togo): Clinical, Radiological and Prognostic Aspects

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Abstract

Introduction: Posterior fossa strokes account for approximately 20 % of all strokes, yet their diagnosis is often delayed due to atypical clinical presentations and limited access to specific neuroimaging, especially in resource-constrained settings. This study aimed to describe the clinical, radiological, and prognostic features of posterior fossa strokes admitted to the Neurology Department of UTH Kara, Togo.

Method: This was a retrospective case series conducted over 12 months (January 1 – December 31, 2024) in the neurology department of UTH Kara. Included cases had radiologically confirmed strokes exclusively localized in the posterior fossa. Data collected included demographic, clinical, radiological, and outcome variables.

Results: Out of 203 hospitalized stroke patients, 20 cases (9.9 %) were located in the posterior fossa. The mean age was 59.9 ± 11.8 years, with a female predominance (70.0 %). Hypertension was the most common comorbidity (80.0 %). The mean Glasgow Coma Score (GCS) was 11.0 ± 4.7, with 35.0 % of patients presenting in a coma. Ischemic strokes predominated (70.0 %), with frequent involvement of the posterior inferior cerebellar artery (PICA). Overall mortality was 25.0 %, with no statistically significant association with stroke type.

Conclusion: Posterior fossa strokes represent a significant clinical burden in Kara, marked by high severity and limited access to advanced imaging. Strengthening technical platforms and enhancing clinical training for early detection are critical to improving patient outcomes.

Keywords

Stroke, Posterior fossa, Kara, Togo, Sub-Saharan Africa.

INTRODUCTION

Strokes represent a major public health concern due to their frequency and the severity of their complications. They are the second leading cause of death and the third leading cause of both morbidity and mortality worldwide [1]. Strokes localized in the posterior fossa form a distinct clinical entity, accounting for approximately 20.0 % of all strokes [2] and 20–25 % of ischemic strokes [3], which underscores their significant prevalence. Their clinical presentation is often polymorphic and atypical, aside from their abrupt onset, which can result in diagnostic delays. Their prognosis is poor due to the increased risk of brain herniation, acute hydrocephalus, and failure of vital centers in the brainstem, leading to high mortality and severe morbidity rates [4,5].

In Africa, documentation on posterior fossa strokes is not only rare, but most existing publications are limited to case reports or specific presentations [6,7]. Underestimation of the actual frequency of strokes in this region of the brain is well established in resource-limited settings, primarily due to the scarce availability of magnetic resonance imaging (MRI) [6,8]. This lack of data is a significant barrier to optimizing public health policy and care strategies. Thus, this study was initiated in Kara (Togo) to establish the

epidemiological, clinical, radiological, and outcome profile of patients with posterior fossa strokes hospitalized at UTH Kara.

MATERIALS AND METHODS

Study Setting

This study was conducted in the Neurology Department of the University Teaching Hospital (UTH) of Kara, located in the city of Kara, the second-largest urban area in Togo after the capital, Lomé. The UTH Kara is the main referral hospital for the northern part of the country, serving the Kara, Central, and Savanna regions; three of Togo's six administrative divisions. Among its various departments, the neurology unit is one of the two principal neurology services in northern Togo. During the study period, diagnostic imaging was limited to CT scans, which were available only in a private facility. MRI was introduced in Kara only in February 2025.

Study Design and Period

This was a retrospective case series conducted over a 12-month period from January 1 to December 31, 2024. Data were collected from medical records of patients admitted during this time.

Inclusion Criteria

The study included patients admitted to the neurology department with a stroke confirmed by imaging (CT scan only) and localized exclusively in the posterior fossa. CT was the only available imaging modality during the study period.

Exclusion Criteria

Excluded were patients admitted during the study period with clinical signs suggestive of stroke but without imaging confirmation, those whose CT scan revealed lesions outside the posterior fossa, patients with posterior fossa pathology unrelated to stroke, and any cases falling outside the study period.

Data Collection

Patient medical records served as the primary source of information. A standardized data collection form was used to record demographic characteristics, clinical presentation at admission, time to admission from symptom onset, radiological findings, and in-hospital clinical outcomes.

OPERATIONAL DEFINITIONS

The following classifications were used:

- **Hypertension grades (WHO classification)**:
  - ☐ Grade 1 (mild): SBP 140–159 mmHg and/or DBP 90–99 mmHg
  - ☐ Grade 2 (moderate): SBP 160–179 mmHg and/or DBP 100–109 mmHg
  - ☐ Grade 3 (severe): SBP ≥ 180 mmHg and/or DBP ≥ 110 mmHg
- **Glasgow Coma Scale (GCS)**:
  - ☐ Coma: GCS < 8
  - ☐ Altered consciousness without coma: GCS 8–13 inclusive
  - ☐ Normal consciousness: GCS > 13
- **National Institutes of Health Stroke Scale (NIHSS)**:
  - ☐ Mild stroke: 0–4
  - ☐ Moderate stroke: 5–15
  - ☐ Severe stroke: >15

Comorbidity: Presence of at least one documented chronic condition, including hypertension, diabetes, epilepsy, prior stroke, heart disease, kidney disease, or HIV infection.

Ethical Considerations

Individual informed consent was not obtained due to the retrospective nature of data collection from medical records. However, patient anonymity was strictly maintained, and confidentiality was preserved throughout the study.

Data Analysis

Data were analyzed using R software (version 4.3.1), and graphs were generated using Microsoft Excel 2021. Descriptive statistics were used to summarize data: categorical variables were expressed as frequencies and percentages, while continuous variables were reported as means with standard deviation (SD) or medians with interquartile range (IQR). Inferential statistics were applied using appropriate tests, and the significance threshold was set at $p < 0.05$.

RESULTS

Frequency and Sociodemographic Characteristics

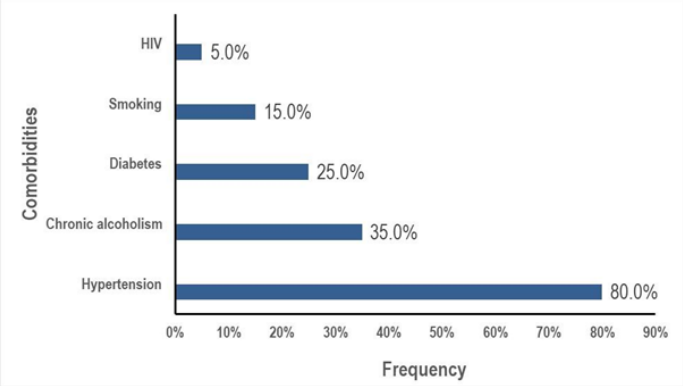
Between January 1 and December 31, 2024, a total of 203 patients were hospitalized in the Neurology Department for imaging-confirmed stroke. Among them, 20 had a posterior fossa stroke, yielding a hospital-based frequency of 9.9 %. The mean age was 59.9 ± 11.8 years (range: 43–85 years). Women were more frequently affected, representing 70.0 % of cases (n = 14), corresponding to a male-to-female ratio of 0.43. The 60–74 age group accounted for half of the cases (n = 10, 50.0 %), followed by the 45–59 age group with 7 patients (35.5 %). Detailed sociodemographic characteristics are presented in Table 1.

Table 1: Sociodemographic Characteristics.

		Frequency (n)	Percentage (%)
Sex	Female	14	70.0
	Male	6	30.0
Age group (years)	< 45	1	5.0
	[45 – 60]	7	35.0
	[60 – 75]	10	50.0
	≥ 75	2	10.0
Mean age ± SD (years)		59.95 ans ± 11.81	
Occupation	Farmer	5	25.0
	Trader	4	20.0
	Housewife	6	30.0
	Artisan	2	10.0
	Unemployed	2	10.0
	Civil servant	1	5.0

Risk Factors and Comorbidities

Hypertension was the most common comorbidity, observed in 16 patients (80.0 %). Other identified risk factors included diabetes (n = 3, 15.0 %) and HIV infection (n = 1, 5.0 %). (See Figure 1).



The average time to admission following symptom onset was 26.9 ± 20.7 hours, with a median of 24.0 hours [IQR: 11.0 ; 38.5]. The average time to brain CT scan was 35.6 ± 30.1 hours, with a median of 25.6 hours [IQR: 14.0 ; 58.2].

Clinically, the mean systolic blood pressure (SBP) at admission was 171.9 ± 17.8 mmHg (range: 143.0–200.0), and the mean diastolic blood pressure (DBP) was 102.9 ± 14.5 mmHg (Table 2).

Table 2: Clinical Findings.

		Frequency (n)	Percentage (%)
Systolic Blood Pressure (mm Hg) (mm Hg)	[140 – 160]	3	15.0
	[160 – 180]	9	45.0
	≥ 180	8	40.0
Diastolic Blood Pressure (mm Hg) (mm Hg)	< 90	3	15.0
	[90 – 100]	4	20.0
	[100 – 110]	6	30.0
	≥ 110	7	35.0
Glasgow Coma Scale (GCS)	[3 – 8]	7	35.0
	[8 – 13]	3	15.0
	> 13	10	50.0
NIHSS Score	[0 – 6]	3	15.0
	[6 – 11]	6	30.0
	[11 – 16]	9	45.0
	≥ 16	2	10.0

The mean Glasgow Coma Score (GCS) was 11.0 ± 4.7. Seven patients (35.0 %) presented in a coma (GCS < 8). The mean NIHSS score was 11.5 ± 5.1, with two patients (10.0 %) scoring above 15 (severe stroke). See Table 2. Ischemic strokes were predominant (n = 14, 70.0 %). Among these, involvement of the posterior inferior cerebellar artery (PICA) was observed in 7 cases (50.0 %)—in 5 cases as an isolated lesion and in 2 cases associated with the anterior inferior cerebellar artery (AICA). The distribution of affected territories is detailed in Table 3. Regarding hemorrhagic strokes (n = 6), the cerebellar hemisphere was affected in all cases (100.0 %), followed by the medulla in 2 patients (33.3 %) (Table 3).

Table 3: Radiological Findings.

		Frequency (n)	% within stroke type
Ischemic strokes n = 14. 70.0%	**PICA (total)**	**7**	**50.0**
	PICA alone	5	35.7
	PICA + AICA	2	14.3
	Autres territoires ischémiques	7	50.0
Hemorrhagic strokes n = 6; 30.0 %	**Cerebellar hemisphere**	**6**	**100.0**
	Medulla oblongata	2	33.3
	Pons	1	16.7

In-hospital Outcomes

Five patients (25.0 %) died during hospitalization, with death occurring after a mean duration of 3.4 ± 2.1 days (range: 1–6 days). The 15 surviving patients (75.0 %) were discharged home after an average hospital stay of 6.0 ± 4.5 days (range: 2–16 days).

There was no statistically significant association between stroke type and mortality (p = 0.13), nor between delayed admission (>24 hours after symptom onset) and death (p = 1.00) (Table 4).

Table 4: Clinical Outcomes.

	Deaths n (%)	Survivors n (%)	p-value
Sex			
Female (n = 14)	3 (21.4)	11 (78.6)	0.61
Male (n = 6)	2 (33.3)	4 (66.7)	
Time to CT Scan			
< 24 heures (n = 9)	2 (22.2)	7 (77.8)	1.0
> 24 heures (n = 11)	3 (27.3)	8 (72.7)	
Type of Stroke			
Ischemic (n = 14)	2 (14.3)	12 (85.7)	0.13
Hemorragic (n = 6)	3 (50.0)	3 (50.0)	

DISCUSSION

This study describes the epidemiological, clinical, radiological, and outcome profile of posterior fossa strokes within the clinical setting of the Neurology Department at UTH of Kara (Togo). It has the inherent limitations of retrospective research, including incomplete data in patient records. Nonetheless, it provides valuable insight into posterior fossa strokes as observed in our practice.

Frequency and Sociodemographic characteristics

Among 203 confirmed stroke cases during the study period, 20 (9.9 %) were localized in the posterior fossa. While the literature rarely reports the global frequency of posterior fossa strokes, most sources describe it based on stroke subtype. Nevertheless, this proportion indicates that vascular pathologies in this region are relatively less common than those affecting supratentorial areas. However, the absence of MRI during the study likely led to underdiagnosis, as MRI is significantly more sensitive than CT for posterior fossa lesions. This finding aligns with Labropoulos et al. who reported a slightly higher proportion of 23 % in the United States in 2011, aided by the routine use of MRI in technologically advanced settings [9].

In our study, female patients predominated (n = 14, 70.0 %). Gender predominance varies across studies: male predominance was reported by Dabilgou et al. [10] and Imam et al. [11], while Diatewa et al. [12] observed no gender disparity. The mean age was 59.9 ± 11.8 years, with the majority of patients aged 60 – 75. This range is consistent with other studies reporting average ages between 55 and 60 years [10,12]. These results support the notion that advanced age is a potential risk factor for posterior fossa strokes. Akinyemi, in his literature review, emphasized that in Africa, strokes generally occur between the fourth and sixth decades of life [13], meaning that younger adults are not exempt.

Clinical and Radiological Findings

Hypertension was the most common comorbidity, with 45.0 % of patients presenting with grade II hypertension, both systolic and diastolic. This finding reinforces the well-established role of hypertension as the primary risk factor for stroke, regardless of type or location [14,15].

Altered consciousness at admission was frequent, as reflected by a mean GCS of 11.0 ± 4.7. Notably, 35.0 % of patients were comatose (GCS < 8), highlighting the clinical severity of posterior fossa lesions. This high severity may be attributed to the presence of vital cardiorespiratory and autonomic centers in the lower brainstem, which can rapidly deteriorate in the event of damage, even in stroke.

The average NIHSS score was 11.5 ± 5.1, with 10.0 % of patients presenting with severe stroke (NIHSS > 15). This mean NIHSS score

is notably higher than in Imam et al.'s 2024 study in Qatar, which reported a mean of 3.8 ± 4.6 [11]. However, both this and other studies point to a tendency for NIHSS to underestimate the severity of posterior fossa strokes, as many neurological functions assessed by the scale are not governed by infratentorial structures. Nonetheless, when a patient presents with profound consciousness alteration, as seen in the 35 % coma rate in this study, multiple NIHSS items are rated highly. Some authors argue that the eNIHSS (expanded NIHSS) is more suitable for posterior circulation strokes, as suggested by Hella et al. [16].

Ischemic strokes were predominant (70.0 %), consistent with findings in both general and posterior circulation-specific stroke studies [1,5,15,17]. Nassar et al. [18] also reported ischemic predominance in their analysis of posterior fossa strokes. In our study, the posterior inferior cerebellar artery (PICA) was involved in half of all ischemic cases (50.0 %), supporting its role as a commonly affected territory in cerebellar infarctions [8,11].

In-hospital Outcomes

Five patients (25.0 %) died during hospitalization, with an average time to death of 3.4 ± 2.1 days. The mortality rate remains high and aligns with findings in the literature. In 2023, Bolognese et al. reported that brainstem stroke lesions were associated with increased mortality risk [18]. Similarly, Dabilgou et al. reported a 19.7 % mortality rate in 2018 among patients with vertebrobasilar ischemia [10]. The elevated fatality rate in our series may be explained by the high proportion of comatose patients at admission [19].

CONCLUSION

Posterior fossa strokes accounted for 9.9 % of all stroke admissions at UTH Kara in 2024. This relatively low proportion may be explained by the limited imaging modalities available during the study period. The absence of MRI, which only became accessible in Kara in early 2025, likely contributed to the under diagnosis of these strokes, especially considering that, aside from alternating syndromes, they rarely present with specific clinical features. Nonetheless, this study confirms that posterior fossa strokes are associated with a guarded prognosis, particularly in hemorrhagic forms, even though the association was not statistically significant. A study involving a larger patient cohort would be valuable to confirm this trend.

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