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Original Research Article

Stroke: Epidemiological and Prognostic Aspects in the Emergency Department of Gabriel Touré University Teaching Hospital

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Abstract: ***Objective*****:** To study the epidemiological and clinical aspects of stroke. ***Methodology*****:** A one-year prospective descriptive study conducted at the Gabriel Touré University Hospital Emergency Department on patients diagnosed with stroke. The tools used were SPSS 22.0, Microsoft Word 2021 and Excel software. The Chi-square test is significant if P is <0.05. The information was collected anonymously and confidentially. ***Results*****:** out of 20,001 admissions to the emergency department, 751 patients were diagnosed with stroke (3.7%). The average age was 61.7± 17.5 years, with a sex ratio of 1.39. The majority were traders (33.4%) and lived in urban areas (77%). Transport was provided by taxis (66.7%), with an average time of 11.9±4.9 hours. The most common medical history was high blood pressure (89.5%). Impaired consciousness was the most common reason for consultation (69%). Hemiplegia was the most common clinical sign (46.2%). The Glasgow score on admission was between 13-15 (44.1%) and Glasgow less than 8 (15%). MAP was 160±45 mmHg for IS and 140±35 mmHg for SAH. DTC was performed (40%), confirming ICH (34%). Strokes were ischaemic (56.1%) and haemorrhagic (33.3%). Secondary cerebral attacks of systemic origin were hyperthermia (55%) and hyponatraemia (30%). Complications were pulmonary (50%) and neurological (26.6%). Treatment was medical (75%) and medico-surgical (25%), with systematic rehydration and prevention of stress ulcers. Mortality was 41.2%, with an average hospital stay of 8.1± 6.5 days. ***Conclusion*****:** Strokes remain a major public health concern. Improving prognosis requires early pre-hospital care with multidisciplinary collaboration and adequate technical facilities.

Keywords: Stroke, SAU, Gabriel Touré University Hospital.

INTRODUCTION

Stroke is a major neurological emergency defined by the World Health Organization (WHO) as a sudden loss of brain function of vascular origin, with focal neurological symptoms lasting more than 24 hours and potentially resulting in death [1]. It remains the leading cause of acquired, non-traumatic disability in adults, the second leading cause of dementia, and the third leading cause of death worldwide [2]. In the United States, stroke accounts for about 17.2% of all deaths [3]. In Senegal, it is responsible for more than 30% of neurological hospital admissions and two-thirds of in-hospital deaths [4]. The introduction of specialized neurovascular intensive care units has greatly improved patient outcomes through earlier and more targeted interventions. However, in Mali, the lack of such facilities at Gabriel Touré University Hospital highlights the need for this study, which aims to evaluate both the therapeutic approach and prognosis of stroke cases managed in the Emergency Department.

METHODOLOGY

This study was carried out over a 12-month period, from February 1, 2024, to February 31, 2025, in the Emergency Department of Gabriel Touré University Hospital in Bamako, Mali. It was a descriptive and analytical cross-sectional study with prospective data collection, including all patients admitted with a confirmed diagnosis of stroke based on brain CT imaging. Patients whose diagnosis was not confirmed or who were admitted outside the study period were excluded. The Emergency Department, which serves as the main referral center for hospital emergencies, is equipped with dedicated facilities such as triage areas,

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resuscitation and short-stay units, and operates with a rotating team of medical and paramedical staff. Data collection included a structured patient interview, a thorough clinical examination, and complementary investigations (imaging and laboratory tests). The study protocol was approved by the Ethics Committee of the Faculty of Medicine and Dentistry of Bamako, and strict adherence to patient confidentiality and informed consent procedures was maintained throughout the study. Data were processed and analyzed using Word, SPSS 22.0, and Excel software. Comparisons of qualitative variables were made using the chi-square or Fisher's exact test, depending on sample size, with a statistical significance threshold set at $p < 0.05$.

RESULTS

Over the 13-month study period, the Emergency Department of Gabriel Touré University Hospital recorded 19,911 admissions, of which 751 were cases of stroke, giving a prevalence of 3.8%. Ischemic stroke was the most common type, accounting for 66.7% (501 cases). The mean age of patients was 61.7 ± 17.5 years (range: 17–98 years), with individuals aged 65 years and above representing 37.3% of the cohort. The male-to-female ratio was 1.39. Most patients were traders (43.4%) and lived in urban settings (77%), with two-thirds arriving directly from home (66.7%), most often transported by taxi (59.3%). The mean time to hospital presentation was 11.9 ± 4.9 hours, and a significant delay (≥ 6 hours) was observed in 73% of cases. Hypertension was the most prevalent comorbidity (89.5%) and the leading risk factor (93.7%), while malnutrition affected 65.4% of patients. The main presenting symptoms were altered consciousness (68.9%) and hemiplegia (46.2%). On admission, 44.1% of patients had a Glasgow score ≥ 13. Common clinical findings included fever (30.8%), tachycardia (43.8%), tachypnea (34.9%), diastolic hypertension (60.2%), systolic hypertension (54.6%), and dehydration (91.1%). Frequent laboratory abnormalities included hyponatremia (34.1%), hypokalemia (60.9%), hyperglycemia (19%), and severe anemia (15%). CT imaging showed that ischemic strokes mainly involved the middle cerebral artery territory (73.5%), whereas hemorrhagic strokes were most often located in the basal ganglia (50.8%). MRI was performed in only 1.1% of cases. Transcranial Doppler (6.7%) revealed intracranial hypertension in 34% of patients; carotid Doppler showed carotid atherosclerosis in 33.3%; and echocardiography detected ventricular dysfunction in 1.5%. Pneumonia was present in 54.4% of patients. Treatment universally included anti-ulcer agents (100%) and physiotherapy (99.5%). The overall outcome was favorable in 51.7% of cases, with an in-hospital mortality rate of 43.2% and an average hospital stay of 5.1 ± 4.6 days. Mortality was significantly associated with advanced age (> 65 years; $p = 0.006$; RR = 1.25 [1.06–1.47]), hemorrhagic stroke ($p = 0.021$; RR = 1.18 [1.02–1.35]), presence of comorbidities ($p = 0.000$; RR = 1.45 [1.27–1.66]), and the need for orotracheal intubation with mechanical ventilation ($p = 0.000$; RR = 1.45 [1.20–1.75]).

Table I: Age distribution

Age group (years)	Frequency	Percentage (%)
inf. 25	14	1,9
25 - 34	37	4,9
35 - 44	74	9,9
45 - 54	133	17,7
55 - 64	213	28,4
≥ 65	280	37,3
Total	751	100,0

Table II: Facteurs de risque

Risk factors	Frequency (n=543)	Percentage (%)
Hypertension	**509**	**93,73**
Smoking	84	15,5
Diabetes mellitus	88	16,2
Hypercholesterolaemia	3	0,6
Physical inactivity	31	5,7
Obesity	19	3,5
Alcohol consumption	28	5,2

Table III: Glasgow Coma Scale on admission

Glasgow Coma Scale	Frequency	Percentage (%)
< 8	111	14,8
9-12	309	41,1
13-15	331	44,1
Total	751	100,0

Table IV: Biological parameters

Biological parameter		Frequency	Percentage (%)
Haemoglobin (g/dL)	< 7	3	0,4
	7–10	56	7,5
	> 10	692	92,1
Sodium (natremia)	Hyponatraemia	256	34,1
	Normal	325	43,3
	Hypernatraemia	170	22,6
Potassium (kalaemia)	Hypokalaemia	457	60,9
	Normal	159	21,2
	Hyperkalaemia	135	18,0
Blood glucose	Hypoglycaemia	1	0,1
	Normal	681 69	90,7 9,2

Tableau IV: Therapeutic management

Treatment	Effectifs (n=751)	Pourcentage (%)
Rehydration	751	100,0
anti-ulcer drugs	751	100,0
Anticoagulants	576	76,9
Antiplatelet agents	576	76,9
Analgesics	615	83,7
Antibiotics	288	38,4
Antihypertensive drugs	257	35,0
Endotracheal intubation, sedation and MV	229	30,4
Oxygen therapy	101	13,7
Antimalarial therapy	137	18,2
Insulin therapy	69	9,2
Anticonvulsants	60	8
Dialysis	15	2,0
Osmotherapy	10	1,3
Surgery (stereotactic procedure)	14	1,9

Table VI: Clinical outcome

Outcome category		Frequency	Percentage (%)
Unfavourable (n = 388)	Death	324	43,2
	Recurrence	64	8,5
Favourable (n = 363)	With sequelae	215	28,6
	Without sequelae	148	19,7
Total		751	100,0

Table VI: Length of hospital stay

Length of stay (days)	Frequency	Percentage (%)
< 5	**535**	**71,2**
5-10	142	18,9
≥ 11	74	9,9
Total	751	100,0

Table VII: Patient outcome

Outcome		Frequency	Percentage (%)
Death		**324**	**43,2**
Transferred to:	Neurosurgery	14	1,8
	Neurology Department	184	24,5
	Intensive Care Unit	45	6,0
	Cardiology	75	10
Discharged with outpatient follow-up		109	14,5
Total		751	100,0

Table IX: Association between age and in-hospital mortality

Age group	Mortality		Total		P
	Yes	No		RR [IC]	
< 65 ans	246	225	471	0,65 [0,47-0,88]	0,006
≥ 65 ans	117	163	280	1,25 [1,06- 1,47]	
Total	363	388	751		

We found a significant association between age and mortality (p = 0.006)

Table X: Glasgow Coma Scale and in-hospital mortality

Glasgow Coma Scale	Mortality		Total		P
	Yes	No		RR [IC]	
< 8	150	164	314	1,18 [0,99-1,40]	0,079
≥ 8	213	224	437	0,81 [0,64-1,03]	
Total	363	388	751		

We did not find a statistically significant association between the Glasgow Coma Scale and in-hospital mortality (p = 0.079).

Table XI: Admission delay and in-hospital mortality

Admission delay	Mortality		Total		P
	Yes	No		RR [IC]	
Early (< 6 hours)	98	104	202	0,99 [0,85-1,16]	0,952
Late (> 6 hours)	265	284	549	1,00 [0,85-1,18]	
Total	363	388	751		

We did not find a statistically significant association between admission delay and outcome (p = 0.952).

Table XII: Diagnosis and in-hospital mortality

Diagnosis	Mortality		Total		P
	Yes	No		RR [IC]	
Haemorrhagic stroke (HS)	106	144	250	1,18 [1,02-1,35]	0,021
Ischaemic stroke (IS)	257	244	501	0,82 [0,69-0,97]	
Total	363	388	751		

We found a statistically significant association between stroke subtype and in-hospital mortality (p = 0.021).

Table XIII: Associated comorbidities and in-hospital mortality

Associated comorbidities	Mortality		Total		P
	Yes	No		RR [IC]	
Yes	106	144	250	1,45 [1,27 -1,66]	0,000
No	257	244	501	0,64 [0,54- 0,76]	
Total	363	388	751		

We found a statistically significant association between associated comorbidities and in-hospital mortality (p < 0.001).

Table XIV: Endotracheal intubation with sedation and mechanical ventilation and in-hospital mortality

IOT + sédation et VM	Mortality		Total		P
	Yes	No		RR [IC]	
Yes	84	145	229	1,45 [1,20-1,75]	0,000
No	279	243	522	0,73 [0,64-0,84]	
Total	363	388	751		

We found a statistically significant association between endotracheal intubation with sedation and mechanical ventilation and in-hospital mortality (p < 0.001).

COMMENTS AND DISCUSSION

This study, conducted at Gabriel Touré University Hospital, provides an overview of the epidemiological, clinical, and outcome characteristics of stroke patients, as well as the factors influencing hospital mortality. With a prevalence of 3.8%, stroke represents a major and growing health burden in emergency departments, reflecting the increasing impact of non-communicable diseases in low-resource settings. Our findings are similar to those reported by Andrianiaina *et al.*, in Fianarantsoa (3.4%) [5], though lower than the 6.2% observed in Burkina Faso by Ouédraogo *et al.*, [6]. Differences in study population, access to neuroimaging, and hospital admission patterns likely explain these variations. Ischemic stroke was the most common subtype (66.7%), consistent with African data showing that 60–80% of strokes are ischemic [7–9]. This predominance is largely related to the high prevalence of

hypertension, identified as the leading risk factor in our cohort (93.7%), echoing findings from studies in Cameroon [8], and Senegal [7]. The mean patient age was 61.7 years, with a significant proportion aged 65 years and above. Similar to observations by Bézot *et al*., [10], and Boysen *et al*., [5], our data confirm that stroke incidence and mortality rise with age (p = 0.006; RR = 1.25), likely due to comorbidities and decreased cerebrovascular reserve among older individuals. A major challenge identified in our study is the considerable delay in hospital presentation—over six hours in 73% of cases. As noted by Kuate *et al*., [8] in Cameroon, such delays preclude the possibility of thrombolytic therapy for ischemic strokes. This reflects limited public awareness of early stroke symptoms and the lack of an organized stroke care network. The in-hospital mortality rate of 43.2% is comparable to that reported in Antananarivo (46.7%) [11], but remains higher than the 33% observed in Burkina Faso [6]. This high fatality likely reflects the severity of cases upon admission and the limited availability of intensive care and monitoring resources. Mortality was significantly higher among patients with hemorrhagic stroke (p = 0.021; RR = 1.18), consistent with literature showing the aggressive course of intracerebral hemorrhage [6-9]. The presence of comorbidities (p = 0.000; RR = 1.45) and the need for mechanical ventilation (p = 0.000; RR = 1.45) were also strong indicators of poor prognosis. Moalla *et al*., [12], similarly found that respiratory and metabolic complications markedly increase mortality risk. In our series, pneumonia affected 54.4% of patients, highlighting respiratory infections as major contributors to adverse outcomes—especially in bedridden patients or those with dysphagia. Electrolyte imbalances such as hypokalemia, hyponatremia, and hyperglycemia were also common and may worsen brain injury. Parsons *et al*., [13], demonstrated that hyperglycemia increases infarct size and mortality. Overall, our findings emphasize that most determinants of stroke mortality in Mali are preventable or modifiable. Improved hypertension control, earlier hospital presentation, and the establishment of specialized stroke units could substantially reduce mortality and long-term disability among stroke patients.

CONCLUSION

This study provides a comprehensive overview of stroke patients managed at Gabriel Touré University Hospital, identifying key predictors of in-hospital mortality—advanced age, hypertension, stroke subtype, delayed presentation, and clinical severity. These findings underscore the persistent challenges in stroke care, particularly the absence of specialized stroke units and limited healthcare resources. Efforts should focus on improving diagnostic and therapeutic capacity, developing dedicated neurovascular care units, and increasing public awareness of early stroke symptoms. Such interventions are essential to reduce mortality and long-term disability, ultimately improving outcomes for stroke patients in Mali.

REFERENCES

1. Broderick JP, Brott TG, Duldner JE, Tomsick T, Huster G. Volume of intracerebral hemorrhage. A powerful and easy-to-use predictor of 30-day mortality. Stroke. juill 1993;24(7):987-93.
2. Kharbach A, Obtel M, Achbani A, Aasfara J, Hassouni K, Lahlou L, *et al.*, Accident vasculaire cérébral ischémique au Maroc : délai préhospitalier et facteurs associés. In Maroc; 2021.
3. Tsao CW, Aday AW, Almarzooq ZI, Alonso A, Beaton AZ, Bittencourt MS, *et al.*, Heart disease and stroke statistics—2022 update: a report from the American Heart Association. Circulation. 2022;145(8):e153-639.
4. Deme H, Badji N, Akpo LG, Dieng O, Diop AD, Niang FG, *et al.*, CT scans and delays in diagnosis of stroke in Senegal's Regional Hospitals: a Multicenter Study of 655 cases. Open J Med Imaging. 2020;10(02):96.
5. Andriamamonjy RA, Rakotoarison H, Rakotondrainibe A, Randrianarisoa A, Rasoaherinomenjanahary F, Rakotoarisoa T, *et al.*, Profil épidémio-clinique, thérapeutique et évolutif des infections post-opératoires en neurochirurgie au Centre Hospitalier de Soavinandriana, Antananarivo, Madagascar. Health Sci Dis. 2023;24(3):1-6.
6. Ouedraogo PV, Savadogo AA, Samadoulougou S, Millogo A, Héma A. Mortalite des accidents vasculaires cerebraux a la phase aigüe au centre Hospitalier Universitaire Souro Sanou Bobo-Dioulasso; Burkina Faso. Afr J Neurol Sci. 2019;38(2):22-9.
7. Basse AM, Diagne NS, Boubacar S, Sow AD, Gams DM, Coumé M, *et al.*, Epidemiology of stroke: a Senegalese study. Ann Clin Pathol. 2017;5(5):1122.
8. Callixte KT, Yacouba MN, Lauriane GM, Jacques D, Gustave ND, Ii DJ, *et al.*, Mortalité par Accident Vasculaire Cérébral et ses déterminants dans un Hôpital de référence de Douala (Cameroun). Health Sci Dis [Internet]. 29 févr 2016 [cité 19 oct 2025];17(1). Disponible sur: https://www.hsd-fmsb.org/index.php/hsd/article/view/585
9. Andrianiaina J, Razafindrabekoto L, Andrianimaro F, HANITRINIAINA M, RASAMOELINA N, RANDRIAMIZAO H, *et al.*, Caractéristiques des accidents vasculaires cérébraux et facteurs associés à la mortalité à Fianarantsoa, Madagascar. Genre. 2023;43(26):8.
10. Béjot Y, Touzé E, Jacquin A, Giroud M, Mas JL. Épidémiologie des accidents vasculaires cérébraux. Médecine/sciences. 2009;25(8-9):727-32.
11. Mananjo D, Andrianimaro F, Randriamasy C, Randriamidona B, Rasolonjatovo T, Raveloson N. Facteurs prédictifs de mortalité précoce des accidents vasculaires cérébraux dans le service ATUR du CHU/JRB (30 cas). Rev Médicale Madag. 2016;6(1):676-80.

12. Moalla KS, Damak M, Chakroun O, Farhat N, Sakka S, Hdiji O, *et al.*, [Prognostic factors for mortality due to acute arterial stroke in a North African population]. Pan Afr Med J. 2020;35:50.
13. Parsons JK, Carter HB, Partin AW, Windham BG, Metter EJ, Ferrucci L, *et al.*, Metabolic factors associated with benign prostatic hyperplasia. J Clin Endocrinol Metab. 2006;91(7):2562-8.

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