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Clinical Severity, Early Complications and In-Hospital Mortality After Acute Stroke: A Prospective Cohort of 1,311 Patients From Guinea

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Research Article

Keywords: Stroke, Acute stroke, Ischemic stroke, Intracerebral hemorrhage, In-hospital mortality, Aspiration pneumonia, Neurological severity, NIHSS, Sub-Saharan Africa, Guinea

Posted Date: June 30th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10035349/v1

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Additional Declarations: No competing interests reported.

Version of Record: A version of this preprint was published at BMC Neurology on September 28th, 2026. See the published version at https://doi.org/10.1186/s12883-026-05304-7.

Abstract

Background

Stroke is a leading cause of death and disability worldwide, with a disproportionate burden in low- and middle-income countries. Data describing stroke severity, early complications, and short-term outcomes in sub-Saharan Africa remain limited. This study aimed to evaluate the clinical severity, early complications, and short-term outcomes of acute stroke and to identify independent predictors of in-hospital mortality in a large prospective cohort from Guinea.

Methods

We conducted a hospital-based prospective cohort study including consecutive adult patients admitted for acute stroke to the Neurology Department of Ignace Deen National Hospital, Conakry, Guinea, between March 2021 and February 2024. Stroke diagnosis was confirmed by neuroimaging. Demographic, clinical, radiological, and outcome data were collected prospectively. Stroke severity was assessed using the National Institutes of Health Stroke Scale (NIHSS) and the Glasgow Coma Scale (GCS). Multivariable logistic regression analysis was performed to identify independent predictors of in-hospital mortality.

Results

A total of 1,311 patients with confirmed stroke were included. Ischemic stroke accounted for 69.6% of cases, whereas intracerebral hemorrhage represented 27.0%. Only 5.3% of patients were admitted within 4 hours and 30 minutes after symptom onset, while 46.7% presented after more than 24 hours. Severe stroke (NIHSS ≥ 11) was observed in 62.2% of patients. Aspiration pneumonia was the most frequent in-hospital complication, affecting 20.4% of patients. Overall in-hospital mortality was 19.6%. Independent predictors of mortality were aspiration pneumonia (adjusted odds ratio [aOR] 4.15; 95% confidence interval [CI] 2.76–6.21; $p < 0.001$), NIHSS ≥ 11 (aOR 3.91; 95% CI 2.45–6.12; $p < 0.001$), Glasgow score ≤ 12 (aOR 2.76; 95% CI 1.81–4.12; $p < 0.001$), intracerebral hemorrhage (aOR 2.21; 95% CI 1.42–3.42; $p = 0.001$), and age > 65 years (aOR 1.82; 95% CI 1.25–2.63; $p = 0.002$).

Conclusions

Acute stroke in Guinea is characterized by delayed hospital presentation, severe neurological impairment, frequent medical complications, and substantial in-hospital mortality. Aspiration pneumonia emerged as the strongest modifiable predictor of death. Strategies aimed at reducing prehospital delays, improving acute stroke care, and preventing post-stroke complications may substantially improve outcomes in resource-limited settings.

INTRODUCTION

Stroke remains one of the leading causes of death and long-term disability worldwide and continues to represent a major challenge for health systems, particularly in low- and middle-income countries. According to the Global Burden of Disease Study, more than 12 million new stroke cases occur annually, accounting for approximately 6.5 million deaths each year. Although important advances have been achieved in stroke prevention and acute management, the burden of disease has progressively shifted toward developing countries, which now account for nearly 70% of all stroke cases and more than 85% of stroke-related deaths worldwide (1, 2).

Sub-Saharan Africa is experiencing a particularly rapid increase in stroke incidence, prevalence, and mortality. Compared with high-income countries, stroke in Africa frequently affects younger individuals, presents with greater neurological severity, and is associated with poorer outcomes (3–5, 20–25). The growing prevalence of hypertension, diabetes mellitus, obesity, and other cardiovascular risk factors, combined with limited access to preventive healthcare, contributes substantially to this increasing burden (3, 5, 6).

Despite these challenges, access to modern stroke care remains uneven across the region. Several African studies have highlighted persistent barriers including delayed hospital presentation, insufficient emergency medical transportation systems, limited availability of neuroimaging, restricted access to reperfusion therapies, and the scarcity of dedicated stroke units (3–5). These constraints often result in delayed diagnosis and treatment, thereby increasing the risk of severe neurological deficits, medical complications, disability, and death.

Early neurological severity is a major determinant of stroke prognosis. The National Institutes of Health Stroke Scale (NIHSS) is widely used to quantify neurological impairment and has consistently been shown to predict mortality and functional outcomes after acute stroke (7). Similarly, the modified Rankin Scale (mRS) remains the most widely accepted tool for assessing post-stroke disability and functional dependence (8). In addition to initial stroke severity, early in-hospital complications such as aspiration pneumonia, cerebral edema, seizures, and systemic infections significantly influence patient outcomes and contribute to increased mortality (9, 10).

In Guinea, stroke represents one of the most frequent neurological emergencies encountered in hospital practice. However, large-scale data describing stroke severity, complications, and short-term outcomes remain limited. Acute stroke management faces several challenges, including delayed patient presentation, limited use of ambulance transportation, restricted access to advanced investigations and reperfusion therapies, and the absence of dedicated stroke units in most healthcare facilities. Consequently, many patients are admitted with advanced neurological deficits and a high risk of preventable complications.

The Neurology Department of Ignace Deen National Hospital in Conakry is one of the main referral centers for stroke care in Guinea and receives patients from both urban and rural regions of the country.

Evaluating the clinical profile, severity patterns, complications, and outcomes of stroke patients managed in this setting may provide valuable information for improving stroke care organization and identifying priorities for intervention.

Therefore, the present study aimed to evaluate the clinical severity, early complications, and short-term outcomes of patients admitted with acute stroke to the Neurology Department of Ignace Deen National Hospital. We also sought to identify factors independently associated with in-hospital mortality in a large hospital-based cohort from Guinea.

METHODS

Study design and setting

We conducted a hospital-based prospective cohort study using data from a prospectively maintained stroke registry at the Neurology Department of Ignace Deen National Hospital, a major tertiary referral center in Conakry, Guinea. Consecutive patients admitted with acute stroke between March 1, 2021 and February 28, 2024 were prospectively enrolled in the registry at the time of hospitalization. Clinical, demographic, radiological, and outcome data were systematically collected using standardized case-report forms throughout the study period.

Study population

During the study period, 1,657 patients were initially recorded in the neurological registry for suspected cerebrovascular events. After verification of clinical records and neuroimaging findings, 1,311 patients with confirmed stroke were retained for the final analysis, whereas 346 patients were excluded because of alternative neurological diagnoses, incomplete records, or absence of confirmatory neuroimaging.

Stroke diagnosis was established according to the World Health Organization definition as a rapidly developing clinical syndrome characterized by a focal or global neurological deficit lasting more than 24 hours or leading to death, with no apparent cause other than vascular origin [11].

The cohort included patients with ischemic stroke, intracerebral hemorrhage, subarachnoid hemorrhage, and cerebral venous thrombosis.

Inclusion and exclusion criteria

Patients were eligible for inclusion if they were aged 18 years or older, presented with clinical features compatible with acute stroke, had stroke confirmed by brain computed tomography or magnetic resonance imaging, and were hospitalized in the Neurology Department during the study period.

Patients presenting with non-vascular neurological disorders mimicking stroke, incomplete clinical records, absence of confirmatory neuroimaging, or uncertain cerebrovascular diagnoses were excluded from the study.

Data collection

Clinical and demographic data were collected using a standardized extraction form based on the institutional stroke database and patient medical records.

Sociodemographic variables included age, sex, marital status, occupation, and area of residence classified as urban, semi-urban, or rural.

Clinical variables included time from symptom onset to hospital admission, mode of transport, neurological symptoms at presentation, Glasgow Coma Scale (GCS) score [28], and National Institutes of Health Stroke Scale (NIHSS) score [7] at admission.

Stroke severity was categorized according to NIHSS values as minor stroke (0–5), moderate stroke (6–10), severe stroke (11–15), very severe stroke (16–20), and extremely severe stroke (> 20). Functional disability was assessed using the modified Rankin Scale (mRS) [8].

Vascular risk factors and medical history, including hypertension, diabetes mellitus, previous stroke, alcohol use, and smoking status, were systematically recorded when available.

Neuroimaging assessment

All patients underwent neuroimaging evaluation using brain computed tomography (CT) or magnetic resonance imaging (MRI) according to clinical indications and local availability. Neuroimaging findings were used to classify stroke subtype and lesion location.

For ischemic stroke involving the middle cerebral artery territory, early ischemic changes were evaluated using the Alberta Stroke Program Early CT Score (ASPECTS) [29], a validated radiological score ranging from 0 to 10.

In patients presenting with intracerebral hemorrhage, hemorrhage severity was assessed using the Intracerebral Hemorrhage (ICH) score [18], which integrates clinical and radiological parameters associated with mortality risk.

Etiological classification

The etiological classification of ischemic stroke was based on clinical evaluation and available complementary investigations, including neuroimaging and cardiovascular assessment when available. Ischemic stroke mechanisms were categorized as atherosclerotic, cardioembolic, lacunar, undetermined, or related to other rare causes.

Etiologies of hemorrhagic stroke included hypertensive microangiopathy, vascular malformations, aneurysmal rupture, anticoagulant-related hemorrhage, and tumoral bleeding.

Treatment and in-hospital management

All patients received standard medical management according to local clinical practice and available therapeutic resources. Treatment strategies included antiplatelet therapy, anticoagulation when indicated, statins, antihypertensive therapy, supportive care, prevention of complications, and early physiotherapy rehabilitation whenever feasible.

Medical complications occurring during hospitalization were actively monitored and treated according to institutional protocols.

Outcomes

The primary outcome was in-hospital mortality.

Secondary outcomes included the occurrence of early in-hospital complications, including aspiration pneumonia, cerebral edema, cerebral herniation, sepsis, pulmonary embolism, pressure ulcers, and epileptic seizures.

Length of hospital stay was also recorded and analyzed.

Statistical analysis

Statistical analyses were performed using R statistical software version 4.3.2.

Continuous variables were expressed as means ± standard deviations or medians with interquartile ranges, as appropriate, whereas categorical variables were presented as frequencies and percentages.

Associations between baseline variables and mortality were initially explored using univariate analysis. The chi-square test or Fisher's exact test was used for categorical variables, whereas Student's t-test was used for continuous variables.

Variables associated with mortality at a significance threshold of $p < 0.20$ in univariate analysis were subsequently entered into multivariable logistic regression models to identify independent predictors of unfavorable outcomes.

Adjusted odds ratios (aORs) with their corresponding 95% confidence intervals (95% CIs) were calculated. Additional multivariable analyses were performed to identify predictors of post-stroke pneumonia and to evaluate the impact of admission delay on mortality.

A p-value < 0.05 was considered statistically significant.

Ethical considerations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Patient confidentiality was strictly respected throughout the study process, and all collected data were anonymized before analysis.

Ethical approval was obtained from the Institutional Ethics Committee of Ignace Deen National Hospital, Conakry, Guinea (Approval No. CECHU-ID062026).

RESULTS

Study population

During the three-year study period, 1,657 patients with suspected cerebrovascular events were identified in the neurological registry of Ignace Deen National Hospital. After review of clinical records and neuroimaging findings, 1,311 patients with confirmed stroke were included in the final analysis, corresponding to 79.1% of registered cerebrovascular events. A total of 346 patients (20.9%) were excluded because of alternative neurological diagnoses, incomplete medical records, or absence of confirmatory neuroimaging (Fig. 1).

Among confirmed stroke cases, ischemic stroke represented the predominant subtype and accounted for 913 patients (69.6%), followed by intracerebral hemorrhage in 354 patients (27.0%), subarachnoid hemorrhage in 39 patients (3.0%), and cerebral venous thrombosis in 5 patients (0.4%).

Sociodemographic characteristics

The mean age of the study population was 61 ± 9.1 years, with extremes ranging from 18 to 102 years. Patients aged between 46 and 65 years represented the most affected age group, accounting for 54.7% of cases, whereas patients older than 65 years represented 21.7% of the cohort.

A slight female predominance was observed, with 683 women (50.9%) and 628 men (49.1%), corresponding to a sex ratio of 0.91.

Most patients were married (64.9%) and predominantly originated from urban areas (52.8%). Informal sector workers represented the largest occupational category (31.9%), followed by housewives (23.3%) and private-sector employees (22.3%) (Table 1).

Table 1
Sociodemographic characteristics of the study population

Variable	n	%
Age group (years)		
≤ 45	309	23.6
46–65	717	54.7
> 65	285	21.7
Sex		
Female	683	50.9
Male	628	49.1
Marital status		
Married	851	64.9
Widowed	293	22.3
Single	121	9.2
Divorced	46	3.5
Occupation		
Informal sector workers	418	31.9
Housewives	305	23.3
Private-sector employees	293	22.3
State employees	211	16.1
Unemployed	84	6.4
Area of residence		
Urban	692	52.8
Semi-urban	417	31.8
Rural	202	15.4

Admission characteristics and transportation

Most patients were admitted directly from home to the neurology department, whereas others were referred or transferred from peripheral healthcare facilities.

Public transportation represented the predominant mode of transportation to hospital admission, accounting for 59.7% of cases, followed by personal vehicles (29.8%) and ambulance transportation (10.4%) (Fig. 2).

Hospital admission was markedly delayed in most patients. Only 5.3% of patients were admitted within the therapeutic window of 4 hours and 30 minutes, whereas nearly half of the cohort (46.7%) presented more than 24 hours after symptom onset (Fig. 3 and Table 2).

Table 2
Admission delay after symptom onset

Admission delay	**n**	**%**
< 4 h 30 min	70	5.3
4 h 30 min–6 h	193	14.7
7 h–24 h	435	33.2
> 24 h	613	46.7

Cardiovascular risk factors and clinical presentation

Hypertension was the most prevalent cardiovascular risk factor, affecting 457 patients (34.8%), followed by diabetes mellitus in 378 patients (28.8%) and previous stroke in 163 patients (12.4%). Alcohol consumption and tobacco use were relatively uncommon in the cohort (Table 3).

Motor deficit represented the most frequent neurological presentation and was observed in 82.9% of patients. Language disturbances were present in 74.9% of cases, whereas disorders of consciousness affected 58.1% of patients. Headache was reported in 43.9% of patients, while seizures occurred in 5.5% of cases (Table 4).

Table 3
Cardiovascular risk factors

Risk factors	n	%
Hypertension	457	34.8
Diabetes mellitus	378	28.8
Previous stroke	163	12.4
Migraine	55	4.2
Alcohol use	48	3.6
Tobacco use	42	3.2
Heart disease	39	2.9
Dilated cardiomyopathy	33	2.5
Oral contraception	21	1.6
Transient ischemic attack	15	1.1

Table 4
Clinical presentation at admission

Clinical signs and symptoms	n	%
Motor deficit	1087	82.9
Language disorders	982	74.9
Disorders of consciousness	762	58.1
Headache	576	43.9
Sensory disturbances	255	19.4
Vertigo	159	12.1
Vomiting	81	6.1
Seizures	73	5.5
Psychomotor agitation	37	2.8
Visual disturbances	21	1.6

Stroke severity and functional disability

Altered consciousness at admission was frequent. According to the Glasgow Coma Scale, 7.1% of patients presented with coma, whereas only 47.2% had normal consciousness at admission (Table 5).

Stroke severity assessed using the NIHSS demonstrated a predominance of severe neurological impairment. Severe stroke (NIHSS 11–15) represented the largest subgroup, accounting for 42.3% of patients, whereas very severe and extremely severe strokes accounted for 13.9% and 6.0% of cases, respectively (Fig. 4 and Table 6).

Functional disability evaluated using the modified Rankin Scale showed that most patients presented moderate-to-severe disability. A modified Rankin score of 4 was observed in 46.1% of patients, whereas severe disability (mRS 5) was identified in 11.1% of cases (Table 7).

Table 5
Glasgow Coma Scale at admission

Glasgow score	n	%
≤ 8	93	7.1
9–10	151	11.5
11–12	217	16.5
13–14	231	17.6
15	619	47.2

Table 6
Stroke severity according to NIHSS

NIHSS category	n	%
Minor stroke (0–5)	165	12.6
Moderate stroke (6–10)	330	25.2
Severe stroke (11–15)	555	42.3
Very severe stroke (16–20)	182	13.9
Extremely severe stroke (> 20)	79	6.0

Table 7
Functional disability according to modified Rankin Scale

Modified Rankin Scale	n	%
2	252	19.2
3	308	23.5
4	605	46.1
5	146	11.1

Neuroimaging findings

The mean delay to neuroimaging was 45.1 ± 28.2 hours, with extremes ranging from 2 to 295 hours. Only 15.6% of patients underwent neuroimaging within the first 4 hours and 30 minutes after symptom onset, whereas 22.8% underwent imaging after more than 48 hours (Table 8).

Among ischemic strokes with available topographic data (n = 918), middle cerebral artery infarction was the most frequent topography (Table 9).Accounting for 78.1% of cases. Posterior cerebral artery infarction represented 12.0% of ischemic strokes, whereas anterior cerebral artery infarction accounted for 9.9%.

Among hemorrhagic strokes with available topographic data (n = 393), deep hematomas predominated and represented 81.2% of cases.

ASPECTS evaluation in middle cerebral artery infarction showed that a score of 7 was the most frequent radiological pattern, observed in 39.2% of patients (Table 10).

Among patients with intracerebral hemorrhage, the ICH score was predominantly equal to 2 (Table 11), accounting for 55.9% of cases. No patients had ICH scores of 4 or 5, whereas 17 patients (4.8%) presented an ICH score of 6.Table 8. Delay to neuroimaging

Table 8
Delay to neuroimaging after stroke onset

Imaging delay	**n**	**%**
≤ 4 h 30 min	205	15.6
4 h 30 min–24 h	432	32.9
24 h–48 h	375	28.6
> 48 h	299	22.8

Table 9
Stroke topography

Topography	n	%
Ischemic stroke (n = 918)		
Middle cerebral artery	717	78.1
Posterior cerebral artery	110	12.0
Anterior cerebral artery	91	9.9
Hemorrhagic stroke (n = 393)		
Deep hematoma	319	81.2
Lobar hematoma	74	18.8

Table 10
ASPECTS distribution in middle cerebral artery infarction

ASPECTS score	n	%
0–3	147	15.9
4–6	147	16.1
7	358	39.2
8–10	261	28.8

Table 11
Intracerebral Hemorrhage (ICH) score distribution

ICH score	n	%
0	11	3.1
1	65	18.3
2	198	55.9
3	63	17.8
6	17	4.8

In-hospital outcomes and complications

Overall, favorable in-hospital evolution was observed in 80.4% of patients, whereas mortality occurred in 257 patients, corresponding to a hospital case-fatality rate of 19.6% (Fig. 5 and Table 12).

Aspiration pneumonia was the most frequent complication and affected 267 patients (20.4%). Cerebral herniation occurred in 5.9% of cases, whereas sepsis and pulmonary embolism were observed in 2.0% and 1.4% of patients, respectively (Table 13).

The mean duration of hospitalization was 10.4 ± 5.3 days, ranging from 1 to 35 days. Most patients remained hospitalized between 7 and 14 days (52.1%) (Table 14).

Table 12
In-hospital outcomes

Outcome	n	%
Favorable evolution	1054	80.4
Death	257	19.6

Table 13
In-hospital complications

Complications	n	%
Aspiration pneumonia	267	20.4
Cerebral herniation	77	5.9
Pressure ulcers	51	3.9
Sepsis	26	2.0
Pulmonary embolism	18	1.4
Seizures	17	1.3

Table 14
Duration of hospitalization

Duration of hospitalization	n	%
< 7 days	70	5.3
7–14 days	683	52.1
> 14 days	558	42.6

Predictors of mortality

In univariate analysis, age greater than 65 years, NIHSS ≥ 11, Glasgow score ≤ 12, aspiration pneumonia, and hemorrhagic stroke were significantly associated with mortality (all $p < 0.001$).

Multivariate logistic regression analysis identified aspiration pneumonia (aOR 4.15; 95% CI 2.76–6.21), NIHSS ≥ 11 (aOR 3.91; 95% CI 2.45–6.12), Glasgow score ≤ 12 (aOR 2.76; 95% CI 1.81–4.12),

intracerebral hemorrhage (aOR 2.21; 95% CI 1.42–3.42), and age greater than 65 years (aOR 1.82; 95% CI 1.25–2.63) as independent predictors of mortality (Fig. 6 and Tables 15–16).

Table 15
Univariate analysis of factors associated with mortality

Variable	Survivors (n = 1054)	Deaths (n = 257)	OR	p-value
Age > 65 years	201 (19.1)	84 (32.7)	2.07	< 0.001
NIHSS ≥ 11	603 (57.2)	213 (82.9)	3.68	< 0.001
Glasgow ≤ 12	311 (29.5)	150 (58.4)	3.36	< 0.001
Aspiration pneumonia	70 (6.6)	197 (76.6)	46.4	< 0.001
Hemorrhagic stroke	251 (23.8)	142 (55.3)	3.95	< 0.001

Table 16
Multivariate logistic regression analysis of predictors

Variable	Adjusted OR	95% CI	p-value
Age > 65 years	1.82	1.25–2.63	0.002
NIHSS ≥ 11	3.91	2.45–6.12	< 0.001
Glasgow ≤ 12	2.76	1.81–4.12	< 0.001
Aspiration pneumonia	4.15	2.76–6.21	< 0.001
Intracerebral hemorrhage	2.21	1.42–3.42	0.001

DISCUSSION

This large prospective cohort of 1,311 patients represents one of the largest hospital-based stroke registries reported from Guinea and provides important insights into stroke severity, early complications, and in-hospital outcomes in a resource-limited African setting. Four principal findings emerged from this study. First, ischemic stroke accounted for nearly 70% of all stroke cases. Second, prehospital delays were substantial, with fewer than 6% of patients reaching hospital within the recommended therapeutic window for reperfusion therapy. Third, severe neurological impairment was highly prevalent at admission. Finally, aspiration pneumonia, severe stroke, impaired consciousness, intracerebral hemorrhage, and older age were independently associated with in-hospital mortality.

The predominance of ischemic stroke observed in our cohort is consistent with findings from international epidemiological studies and major African stroke registries. According to the Global Burden of Disease studies, ischemic stroke accounts for approximately two-thirds of all stroke events worldwide, although hemorrhagic stroke remains disproportionately frequent in low- and middle-income countries because of inadequate control of vascular risk factors and limited preventive care (1–3, 22).

Similar distributions have been reported across West Africa, particularly by the Stroke Investigative Research and Educational Network (SIREN), which identified hypertension as the dominant modifiable risk factor for stroke among African populations (20). Our findings reinforce growing evidence that sub-Saharan Africa is undergoing a major epidemiological transition characterized by increasing exposure to cardiovascular risk factors and a rapidly expanding burden of cerebrovascular disease (3, 5, 20, 25).

An important observation in the present study is the relatively young age profile of affected patients. More than half of the cohort was aged between 46 and 65 years. This age distribution differs from that commonly reported in Europe and North America, where stroke predominantly affects older populations (1, 22). Similar findings have been documented across sub-Saharan Africa, suggesting that stroke disproportionately affects economically productive individuals in the region (3–5, 23, 25). This pattern likely reflects insufficient detection and control of vascular risk factors, limited access to preventive healthcare services, and persistent socioeconomic inequalities. Consequently, stroke in Africa generates substantial social and economic consequences that extend beyond mortality and disability.

One of the most concerning findings was the magnitude of prehospital delay. Only 5.3% of patients arrived within 4.5 hours after symptom onset, whereas nearly half presented more than 24 hours after symptom onset. Comparable delays have been reported throughout sub-Saharan Africa, where poor public awareness of stroke symptoms, deficiencies in emergency transportation systems, financial constraints, and delayed referral pathways remain major barriers to timely stroke care (4, 5, 14, 24). The fact that only 10.4% of patients were transported by ambulance further illustrates the limitations of prehospital stroke organization in Guinea. Such delays effectively exclude most patients from evidence-based reperfusion therapies and likely contribute to the severe neurological deficits observed at admission. Worldwide reports indicate that access to intravenous thrombolysis remains extremely limited in low-resource settings, thereby widening disparities in stroke outcomes between developed and developing countries (26).

Stroke severity was remarkably high in our cohort. More than 60% of patients presented with NIHSS scores ≥ 11, reflecting severe neurological impairment at admission. Admission NIHSS remained one of the strongest independent predictors of mortality, increasing the risk of death nearly fourfold. These findings are consistent with previous studies demonstrating that NIHSS is among the most robust predictors of both short-term mortality and long-term disability following stroke (7, 12, 13). Severe neurological impairment often reflects extensive cerebral injury, large-vessel occlusion, cerebral edema, and increased susceptibility to medical complications. The predominance of severe stroke in our cohort likely reflects the combined effects of delayed presentation, limited access to reperfusion therapies, and inadequate prehospital care.

Aspiration pneumonia emerged as the strongest independent predictor of mortality. Patients who developed pneumonia experienced more than four times the risk of in-hospital death compared with those who did not. This observation is consistent with previous studies identifying post-stroke pneumonia as one of the most frequent and devastating complications of acute stroke (9, 10, 16, 17).

Dysphagia, impaired consciousness, immobility, and severe neurological deficits are well-recognized risk factors for aspiration pneumonia. Beyond respiratory compromise, pneumonia may worsen cerebral injury through systemic inflammation, hypoxemia, and metabolic disturbances. Because aspiration pneumonia is potentially preventable, systematic dysphagia screening, early mobilization, respiratory physiotherapy, and infection-prevention measures should become priorities within stroke care pathways in Guinea and similar resource-constrained settings.

Age greater than 65 years remained independently associated with mortality. Similar findings have consistently been reported in both high-income and low-income settings (1, 13, 15, 22). Older patients often present with multiple comorbidities, reduced physiological reserve, frailty, and increased susceptibility to complications. Likewise, intracerebral hemorrhage was associated with a significantly worse prognosis than ischemic stroke. This observation is biologically plausible because hemorrhagic stroke is frequently accompanied by hematoma expansion, intracranial hypertension, cerebral herniation, and rapid neurological deterioration (18, 19). The predominance of deep hematomas in our cohort further supports the major contribution of hypertensive small-vessel disease to stroke mortality in Guinea.

Reduced Glasgow Coma Scale score also emerged as an independent predictor of mortality. Altered consciousness often reflects extensive cerebral injury, increased intracranial pressure, brainstem involvement, or severe systemic complications. Previous studies have shown that advanced age and greater neurological severity are strongly associated with poor functional outcomes and early mortality after stroke (13). Our findings underscore the importance of early neurological assessment and intensive monitoring of patients presenting with impaired consciousness.

The overall in-hospital mortality rate of 19.6% observed in our study remains substantially higher than rates reported in most high-income countries, where stroke-unit care, advanced neuroimaging, and widespread use of reperfusion therapies have significantly improved survival (1, 15, 27). However, mortality rates comparable to ours have been reported in several African cohorts, highlighting persistent deficiencies in stroke systems of care across the continent (3–5, 23, 25). These findings emphasize the urgent need for national stroke strategies focused on prevention, early recognition, rapid referral, and specialized stroke management.

From a public health perspective, our findings strongly support the implementation of organized stroke care pathways in Guinea. Public education campaigns aimed at improving recognition of stroke warning signs, strengthening emergency transportation systems, expanding access to neuroimaging, and establishing dedicated stroke units should constitute major healthcare priorities. These findings further support international recommendations emphasizing primary prevention and population-based control of vascular risk factors as essential strategies to reduce the burden of stroke worldwide (21). Furthermore, evidence from randomized trials and meta-analyses has consistently demonstrated that organized stroke-unit care significantly reduces mortality and dependency compared with conventional

ward management (27). Adaptation of such interventions to resource-limited environments could substantially improve stroke outcomes throughout Guinea.

The strengths of this study include its prospective design, large sample size, systematic data collection, and comprehensive assessment of stroke severity, complications, and outcomes. To our knowledge, this is the largest prospective hospital-based stroke cohort reported from Guinea. Nevertheless, several limitations should be acknowledged. First, the study was conducted in a single tertiary referral center, potentially limiting the generalizability of findings to other healthcare settings. Second, long-term follow-up data were unavailable, preventing assessment of post-discharge mortality and functional outcomes. Finally, some advanced diagnostic investigations and therapeutic interventions were not consistently available because of resource constraints.

Despite these limitations, the present study provides valuable evidence regarding the contemporary burden of stroke in Guinea and identifies several potentially modifiable determinants of mortality. Reducing prehospital delays, preventing aspiration pneumonia, improving acute stroke management, and expanding access to organized stroke-unit care may represent the most effective strategies for reducing stroke-related mortality in this setting.

CONCLUSION

Acute stroke in Guinea is characterized by delayed hospital presentation, severe neurological impairment at admission, frequent medical complications, and substantial in-hospital mortality. Aspiration pneumonia, severe neurological deficit, impaired consciousness, intracerebral hemorrhage, and advanced age were identified as major predictors of mortality.

These findings highlight the urgent need to strengthen stroke awareness, improve emergency referral systems, expand access to neuroimaging, and develop organized multidisciplinary stroke-unit care in resource-limited settings. Early recognition and prevention of post-stroke complications may substantially improve short-term outcomes and reduce stroke-related mortality in Guinea.

DECLARATIONS

Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and its subsequent amendments. Ethical approval was obtained from the Institutional Ethics Committee of Ignace Deen National Hospital, Conakry, Guinea. Given the observational nature of the study and the use of anonymized registry data, informed consent was waived by the ethics committee.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Funding

The authors received no specific funding for this study.

Author Contribution

COS conceived and designed the study, supervised data collection, performed the statistical analyses, interpreted the data, and drafted the manuscript.MTD, TM, CA, AOSD, and FAC contributed to patient recruitment, data acquisition, data verification, interpretation of the findings, and critical revision of the manuscript for important intellectual content.All authors read and approved the final manuscript.

Acknowledgements

The authors sincerely thank the medical and nursing staff of the Department of Neurology, Ignace Deen National Hospital, Conakry, Guinea, for their invaluable contribution to patient care and data collection throughout the study period.

Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request

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Figures

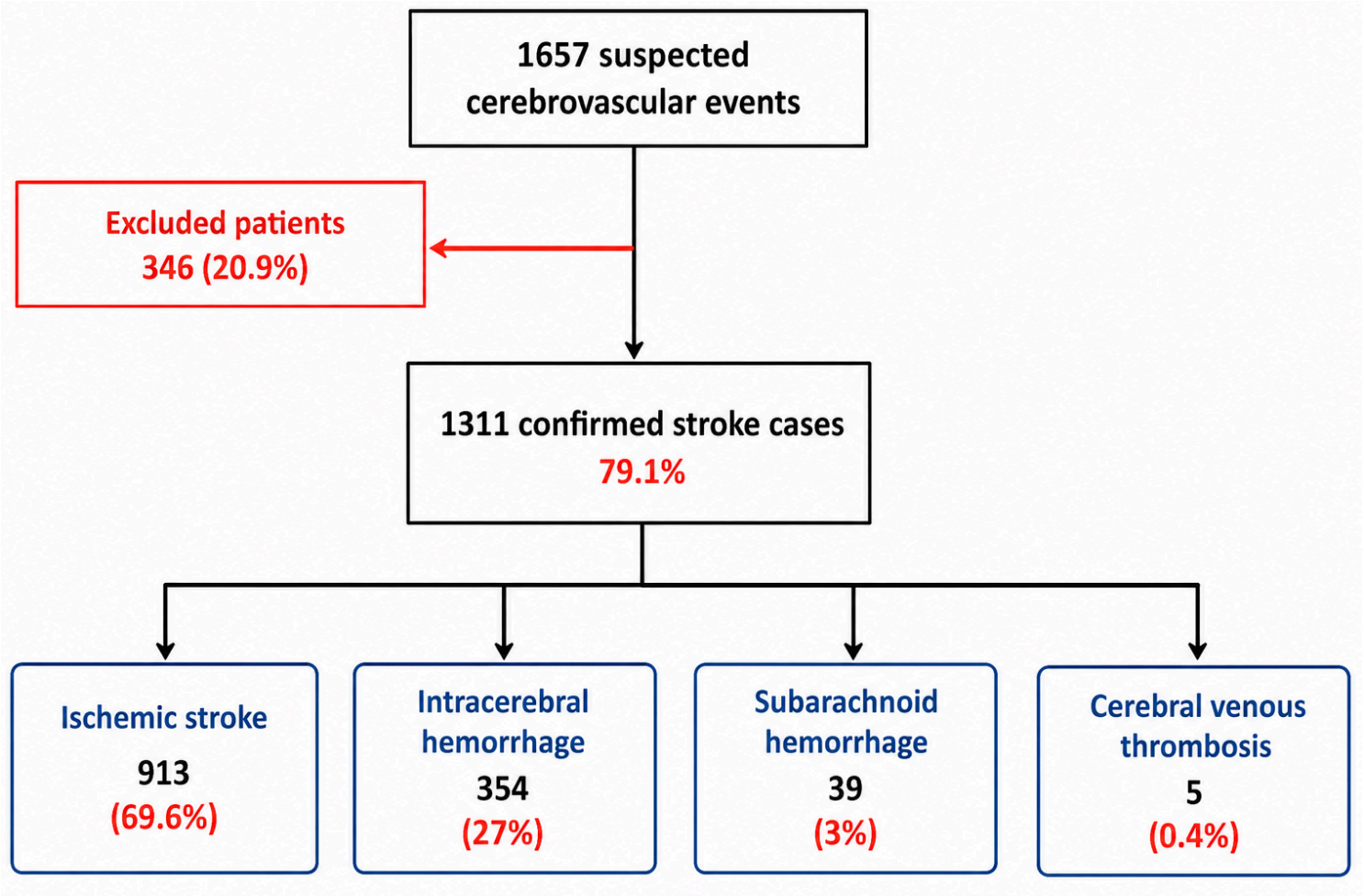

Figure 1

Flowchart of patient inclusion and distribution of stroke subtypes

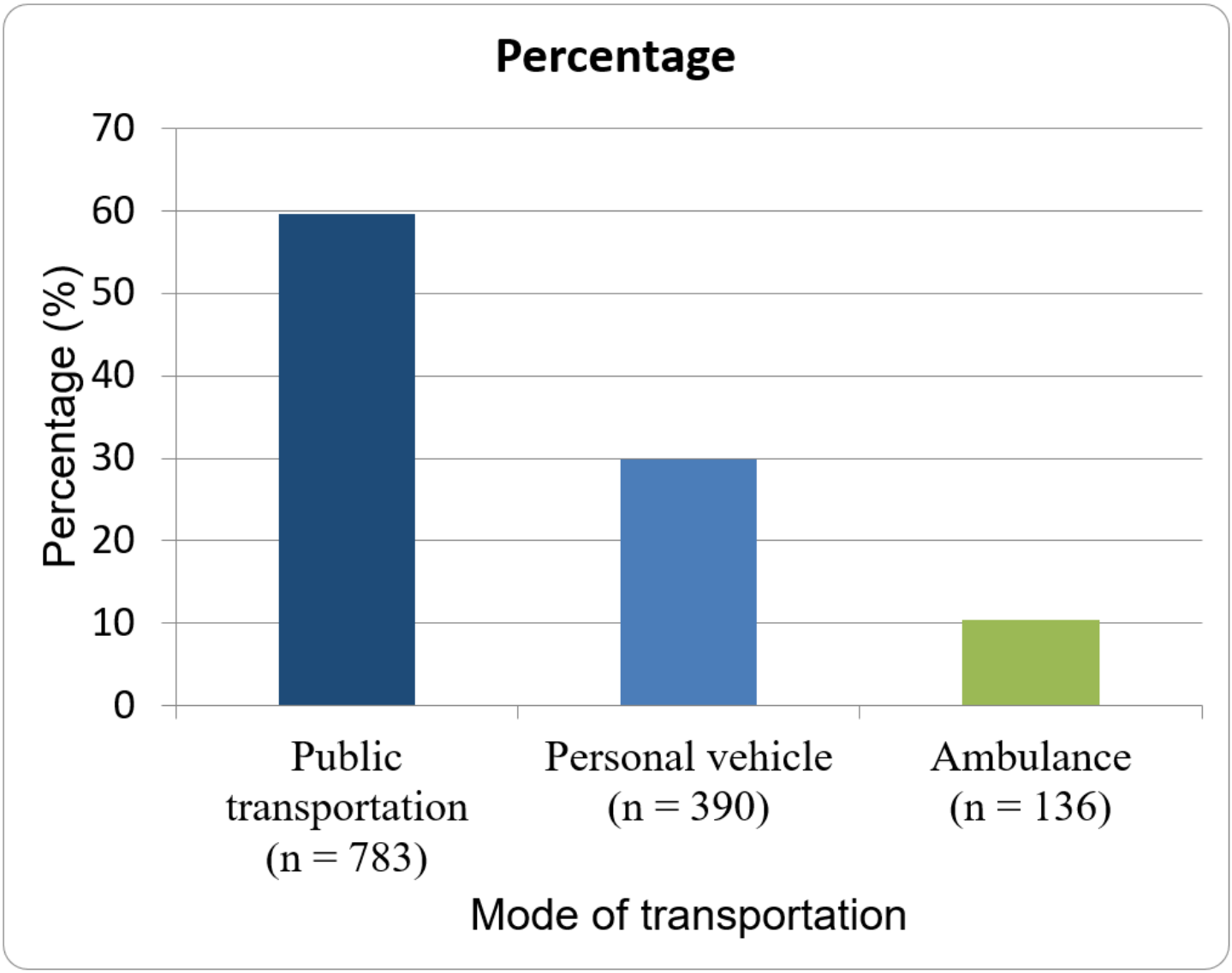

Figure 2

Mode of transportation to hospital among patients with acute stroke.

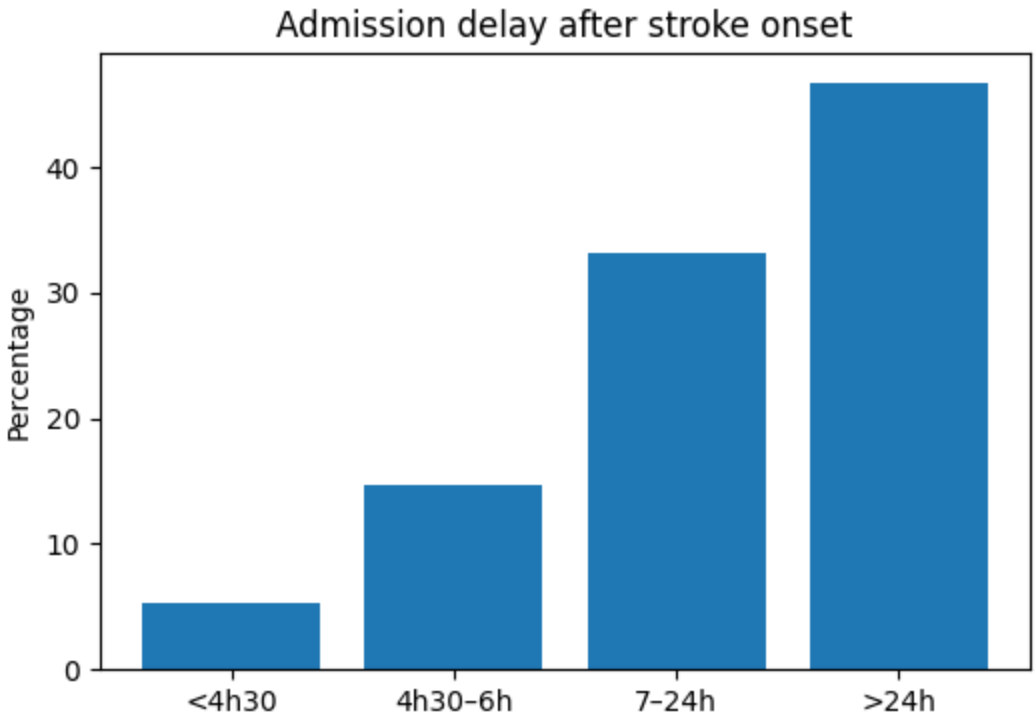

Figure 3

Distribution of admission delay after stroke onset.

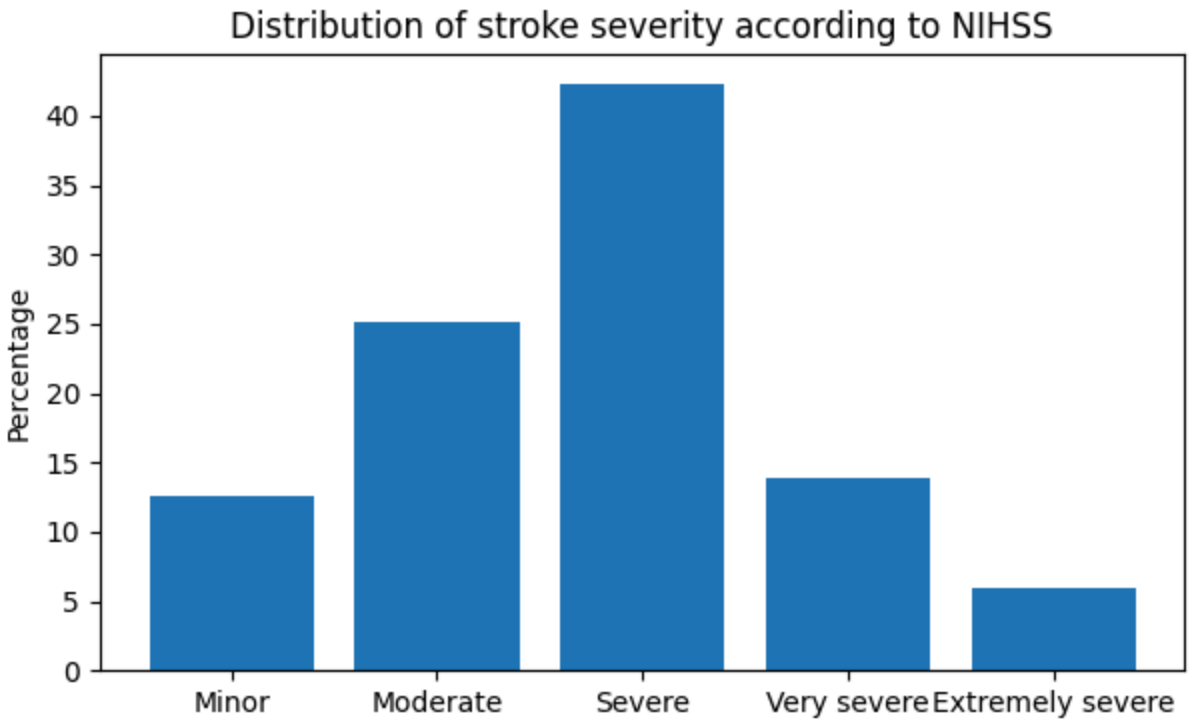

Figure 4

Distribution of stroke severity according to NIHSS categories.

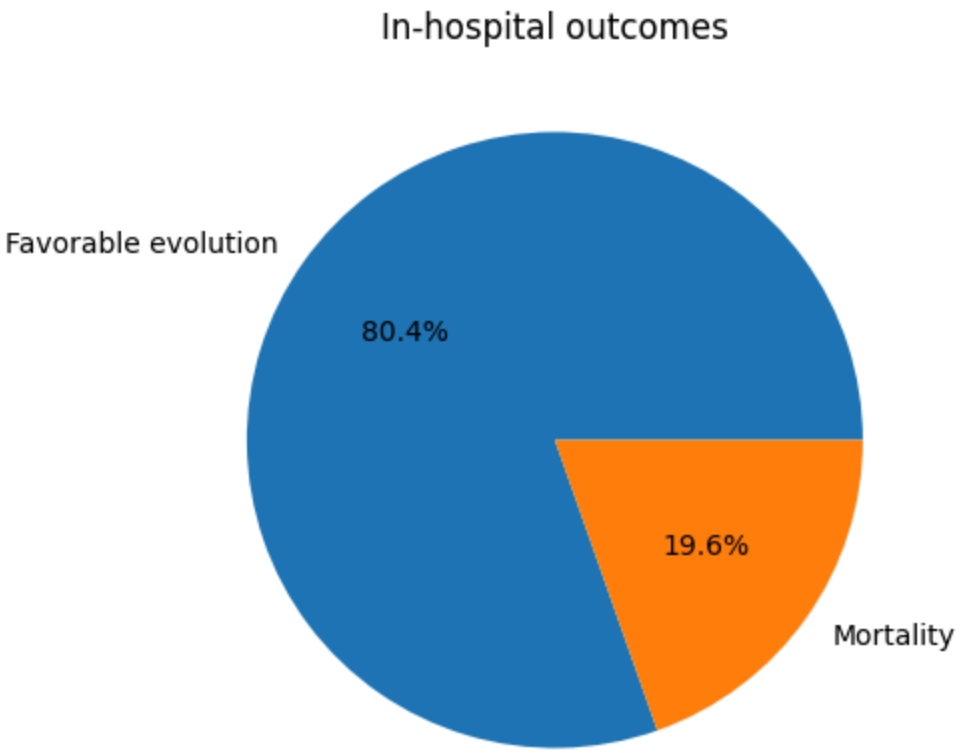

Figure 5

In-hospital outcomes among patients with acute stroke.

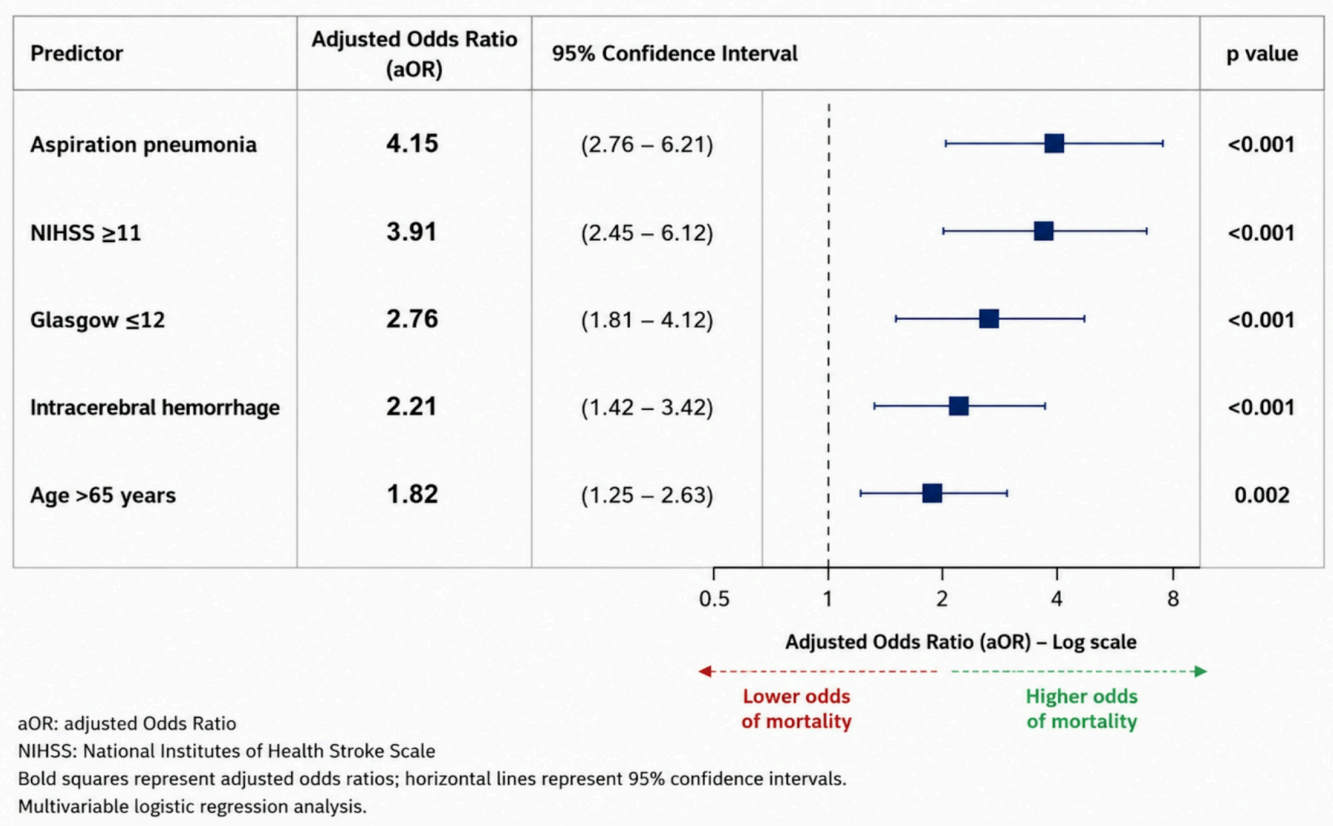

Figure 6

Forest plot of independent predictors of mortality.