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Spectrum and Outcomes of Neurological Emergencies in Adults Admitted to Ghiathy Hospital, Abu Dhabi, UAE: A Retrospective Observational Study

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Abstract

Background and objective: Acute neurological emergencies account for a considerable number of presentations in emergency departments globally, especially in secondary-care hospitals operating under referral-based systems. In many Gulf Cooperation Council countries, secondary facilities rarely have a dedicated, on-site neurology unit; hence, critical concerns frequently arise regarding the overall sufficiency and safety of the care pathway under standardized triage protocols. This clinical environment in the Emirate of Abu Dhabi, United Arab Emirates (UAE), is characterized by a unique demographic landscape, with a highly diverse, young-to-middle-aged expatriate workforce. This population demonstrates an unusually high prevalence of accelerated, poorly controlled cardiovascular risk factors. Consequently, this study aimed to map the spectrum, neuroimaging features, and short-term functional outcomes of acute neurological emergencies admitted to a regional secondary-care hospital to determine pathway safety.

Methodology: This retrospective analysis evaluated adult patients aged 18 years or older who presented with acute neurological emergencies at Ghiathy Hospital in Abu Dhabi, UAE, between September 2022 and August 2025. Eligible cases included patients admitted with acute ischemic stroke, transient ischemic attack (TIA), seizure-related emergencies, or acute headache syndromes. Baseline clinical stroke severity was systematically quantified using the National Institutes of Health Stroke Scale (NIHSS). Short-term functional outcome was assessed at the exact time of hospital discharge utilizing the modified Rankin Scale (mRS).

Results: During the study period, 307 adult patients with neurological emergencies were admitted to the emergency department. Functional outcome was assessed only in the stroke/TIA subgroup (n = 64; 20.8% of the cohort); mRS was not assessed in the headache or seizure groups. Acute headache syndromes comprised the largest proportion of presentations, accounting for 71.3% (n = 219; 95% CI: 65.8-76.3%), followed by acute ischemic stroke at 20.8% (n = 64; 95% CI: 16.5-25.8%) and seizure-related emergencies at 7.8% (n = 24; 95% CI: 5.1-11.4%). Among the stroke cohort, baseline NIHSS scores spanned from mild to severe deficits. Emergency neuroimaging successfully delineated the anterior and posterior circulations and lacunar infarcts. Among the acute ischemic stroke/TIA subgroup, short-term functional outcomes at discharge were predominantly favorable, with the majority achieving functional independence (mRS 0-2); the mRS was not assessed in the headache or seizure subgroups.

Conclusion: It is suggested that a protocol-driven clinical approach be combined with rapid neuroimaging and established referral pathways to the tertiary hospitals. Furthermore, the researchers may conduct prospective multicentric studies with extended long-term follow-up to validate these findings and optimize regional care and referral networks.

Categories: Neurosurgery
Keywords: acute headache, modified rankin scale, national institute of health stroke scale, neurological emergencies, secondary care, seizure, stroke, united arab emirates

Introduction

Acute neurological emergencies encompass a broad spectrum of critical conditions that demand rapid clinical recognition, definitive diagnostic evaluation, and immediate therapeutic intervention. Acute conditions such as acute ischemic stroke, intracranial hemorrhage, status epilepticus, and central nervous system infections represent a significant proportion of emergency department presentations globally [1,2].

These emergencies are major drivers of the long-term burden on global healthcare infrastructure. The clinical trajectory is highly time-dependent, meaning that delays in primary assessment of the patient or neuroimaging can lead to irreversible neuronal loss. Consequently, our understanding of specific epidemiology and prevalence of these conditions within any given healthcare setting is fundamental to optimizing triage pathways and effectively allocating available critical care resources.

Although extensive epidemiological data exist for tertiary academic medical centres, the spectrum and management of neurological emergencies within secondary-care hospitals remain underreported. The secondary-care facilities serve as vital frontline institutions that provide initial stabilization and essential diagnostic workups. In the Emirate of Abu Dhabi, United Arab Emirates, the clinical environment is characterized by a unique demographic landscape [3].

The emergency medical system in the Emirate of Abu Dhabi is organized at the emirate level rather than on a district basis. Prehospital care is provided by a single unified ambulance service (Abu Dhabi Ambulance Services) operating a centralized dispatch and triage system. Ambulances use a structured prehospital triage protocol in which patients with suspected stroke or other time-critical neurological emergencies are identified using the FAST (Face, Arm, Speech, Time) screen and are transported, where possible, directly to the nearest facility capable of definitive care. Hospital care is delivered through the Abu Dhabi Health Services Company (SEHA), a public provider network that operates a tiered system of primary, secondary, and tertiary facilities. Secondary-care hospitals such as Ghiathy Hospital provide frontline stabilization, CT imaging, and initial management, and transfer time-critical patients to designated tertiary centres (Sheikh Khalifa Medical City (SKMC), Sheikh Shakhbout Medical City (SSMC), and Cleveland Clinic Abu Dhabi) under a formal referral network. This type of referral-based model is characteristic of several Gulf Cooperation Council (GCC) health systems and is central to interpreting the case mix and outcomes reported here.

The regional population is characterized by a highly diverse, young-to-middle-aged expatriate workforce. This specific demographic often presents with early-onset, poorly controlled cardiovascular risk factors, such as metabolic syndrome, hypertension, and diabetes mellitus [4]. Despite these unique population dynamics, structured clinical data mapping how these demographic factors influence the spectrum, neuroimaging features, and immediate functional outcomes of neurological emergencies in an Abu Dhabi secondary-care setting is remarkably sparse.

In clinical settings, determining stroke severity and predicting functional outcome at discharge relies heavily on standardized clinical metrics and rapid neuroimaging. The National Institutes of Health Stroke Scale (NIHSS) is a widely validated tool for quantifying baseline neurological deficits [5], while non-contrast computed tomography and magnetic resonance imaging provide critical structural context on the vasculature and tissue viability [6]. The evaluation of baseline severity scores alongside objective radiographic markers allows clinicians to anticipate short-term functional outcomes, which are quantified using the modified Rankin Scale (mRS) at hospital discharge [7]. However, secondary-care centres frequently operate under distinct constraints, including the absence of on-site advanced neurointerventional capabilities, which necessitates prompt stabilization and coordinated transfer protocols to tertiary stroke centres [8]. Examining how baseline clinical severity correlates with short-term functional outcomes within this specific tier of care is essential for evaluating regional healthcare delivery.

This study was designed to systematically evaluate the clinical patterns of acute neurological presentations within this specific healthcare framework. The primary objective of this study was to describe the spectrum and relative frequency of four selected neurological emergency presentations (acute ischemic stroke/transient ischemic attack (TIA), seizure-related emergency, and acute headache syndrome) admitted to a secondary-care hospital in Abu Dhabi. Secondary objectives were to describe baseline stroke severity using the NIHSS and primary neuroimaging findings and to describe short-term functional status at discharge using the mRS among stroke/TIA patients. Because process and safety metrics were not captured, the study does not aim to evaluate pathway safety; rather, it provides descriptive benchmark data to inform future prospective evaluations.

Materials And Methods

Study design and setting

This retrospective, single-center, observational cohort study was conducted in the Emergency Department of Ghiathy Hospital, Abu Dhabi, United Arab Emirates. Ghiathy Hospital is an acute secondary-care facility managed by Abu Dhabi Health Services Company (SEHA). The study included patients presenting to the emergency department during the 36-month study period from September 2022 to August 2025. Patients were selected using a convenience sampling approach based on the predefined eligibility criteria.

Clinical pathway for neurological emergencies

Ghiathy Hospital operates a standardized, protocol-driven emergency neurological pathway. All patients arriving with suspected acute neurological emergency are triaged using the Canadian Triage and Acuity

Scale (CTAS) and, where stroke is suspected, the BE-FAST (Balance, Eyes, Face, Arm, Speech, Time) screening tool. A code stroke pathway is activated at triage for any suspected stroke, involving (i) immediate non-contrast CT imaging, (ii) simultaneous point-of-care glucose and coagulation testing, (iii) emergency physician assessment with neurology teleconsultation within 30 minutes, and (iv) activation of the referral pathway to the tertiary stroke centre for patients eligible for intravenous thrombolysis or mechanical thrombectomy. Patients with suspected subarachnoid haemorrhage undergo non-contrast CT within six hours of onset, with lumbar puncture reserved for CT-negative cases presenting within 12 hours. Suspected seizure-related emergencies are managed according to a written status epilepticus algorithm (benzodiazepine first-line, second-line levetiracetam/valproate, and escalation to anaesthesia for refractory cases). Acute headache is evaluated using a structured checklist incorporating the Ottawa Subarachnoid Hemorrhage (SAH) rule and red-flag criteria. All pathway documents are reviewed annually by the hospital's Emergency and Neurology Committees. Adherence to the pathway is audited monthly as part of routine quality assurance; however, individual-level adherence data were not extracted for this retrospective cohort and are therefore not reported.

Study population and eligibility criteria

Patients aged 18 years or older who presented to the emergency department during the study period with a primary emergency presentation of acute ischemic stroke, TIA, seizure-related emergency, or acute headache syndrome were eligible for inclusion. Patients were required to have sufficient clinical and radiological documentation to permit complete extraction of the variables relevant to the study. Patients with intracranial haemorrhage, CNS infection, or neuromuscular emergencies were not included because, under the regional referral protocol, such patients are transferred directly from triage to tertiary centres and are not admitted to this facility; this is a recognized selection effect. The inclusion and exclusion criteria are summarized in Table *1*.

Inclusion criteria	Exclusion criteria
Age ≥18 years	Elective neurological referrals rather than acute emergency evaluation
Primary emergency presentation of acute ischemic stroke	Chronic neurological conditions without evidence of an acute-onset exacerbation
Primary emergency presentation of transient ischemic attack (TIA)	Transferred from another healthcare facility after completion of the initial emergency department evaluation
Primary emergency presentation of seizure-related emergency	
Primary emergency presentation of acute headache syndrome	
Sufficient clinical and radiological documentation to permit complete extraction of study variables	

TABLE 1: Inclusion and exclusion criteria

Operational definitions

Acute headache syndrome was defined as a headache of acute onset that required emergency evaluation to exclude potentially serious secondary causes, including subarachnoid hemorrhage, meningitis, and hypertensive emergencies, in accordance with the International Classification of Headache Disorders, Third Edition (ICHD-3) [9] and relevant emergency headache guidelines.

Acute ischemic stroke was defined as a sudden neurological deficit of vascular origin lasting more than 24 hours or as one confirmed by neuroimaging, consistent with the definitions provided by the World Stroke Organization [10] and the American Heart Association/American Stroke Association (AHA/ASA) [11] guidelines. TIA was defined as a transient neurological deficit attributable to cerebral ischemia without evidence of acute infarction on neuroimaging and with resolution of symptoms within 24 hours.

A seizure-related emergency was defined as an acute-onset seizure requiring emergency medical evaluation, including a first seizure, a breakthrough seizure in a patient with epilepsy associated with acute clinical decompensation, or status epilepticus, based on the classification of the International League Against Epilepsy (ILAE) [12].

Acute headache presentations were evaluated according to the clinical and radiological workup performed in the emergency department.

Radiological classification

Neuroimaging findings were classified into six categories: no acute infarction or suspected TIA; anterior circulation infarction involving the middle cerebral artery or anterior cerebral artery territories; posterior circulation infarction involving the posterior cerebral artery, brainstem, or cerebellum; deep or lacunar infarction involving the basal ganglia, internal capsule, or thalamus; ischemic infarction with an unspecified anatomical location; and vascular variants or incidental abnormalities. The interpreting radiologist and the treating neurologist confirmed the radiological classification.

Data collection and variables

Data were retrospectively extracted from the hospital's electronic medical records (EMRs). Two independent investigators extracted the relevant information into an externally maintained Microsoft Excel database. Any discrepancies between the extracted datasets were reviewed and resolved by a third independent reviewer.

The collected variables included demographic characteristics such as age and sex; baseline Glasgow Coma Scale (GCS) score [13]; National Institutes of Health Stroke Scale (NIHSS) score [14]; primary neurological diagnosis; neuroimaging modality and findings; and short-term functional outcome at discharge, as assessed using the mRS [15].

Among the 64 patients with stroke, NIHSS scores were available for 58 (90.6%) and unavailable for six (9.4%). The absence of NIHSS documentation was primarily due to initial assessments by non-neurologist emergency physicians before the neurology teleconsultation. Neuroimaging data were available for 61 patients (95.3%). Patients with missing NIHSS or neuroimaging data were excluded only from analyses that required those variables. Missing data were reported transparently, and no imputation methods were applied.

Data management and confidentiality

The extracted data were stored on a password-protected institutional server accessible only to the named investigators. Before analysis, the dataset was anonymized and contained no personally identifiable information. All data handling and analysis were performed in accordance with institutional requirements for confidentiality and data protection.

Ethical considerations

The study protocol was reviewed and approved by the Abu Dhabi Health Services Company (SEHA) Institutional Review Board, Abu Dhabi, United Arab Emirates (IRB Reference Number: ADH REC 200526C; approval date: June 12, 2026). The study was conducted in accordance with the principles of the Declaration of Helsinki. Informed consent was waived because the study involved retrospective analysis of existing medical records, did not involve direct patient contact, and used anonymized data without personal identifiers. The study report was prepared in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines, and the completed STROBE checklist is provided as a supplementary file.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics version 29.0 (IBM Corp., Armonk, NY, USA). Continuous variables were summarized as mean ± standard deviation (SD) for normally distributed data or median with interquartile range (IQR) for non-normally distributed data. Categorical variables were presented as frequencies and percentages. Ninety-five percent confidence intervals (CIs) for proportions were calculated using the Wilson score method.

Comparisons among the acute ischemic stroke, seizure-related emergency, and acute headache syndrome groups were performed using the Pearson chi-square test for categorical variables and the Kruskal-Wallis test for continuous variables that were not normally distributed. The association between NIHSS severity and functional status at discharge, measured using the mRS, was assessed using Spearman's rank correlation coefficient. Patients with missing values for a variable were excluded from analyses involving that variable. No data imputation was performed. For chi-square tests, the degrees of freedom (df) and Cramér's V (effect size) were reported alongside the p-value. Cramér's V was interpreted as follows: 0.10 = small, 0.30 = medium, and 0.50 = large effect. For the one-way ANOVA, eta-squared (η^2) was reported as the effect size, with values of 0.01, 0.06, and 0.14 indicating small, medium, and large effects, respectively. Baseline characteristics are reported by diagnostic group. The Spearman correlation between NIHSS and discharge mRS was performed only within the stroke/TIA subgroup, where both variables were clinically meaningful, and is reported as a secondary, exploratory analysis; it is not used to support causal or predictive claims.

Results

Of the 307 patients, 168 (54.7%) were admitted to an inpatient ward, 24 (7.8%) were managed in the

emergency observation unit, 89 (29.0%) were discharged directly from the emergency department, and 26 (8.5%) were transferred to a tertiary centre. Admission rates differed by diagnostic group: acute ischemic stroke/TIA 58/64 (90.6%), seizure-related emergencies 18/24 (75.0%), and acute headache syndromes 92/219 (42.0%).

During the 36-month study period, 307 adults with neurological emergencies were evaluated. Acute headache was the most common presentation, accounting for 219 (71.3%) patients, followed by acute ischemic stroke/TIA in 64 (20.8%) patients and seizure-related emergencies in 24 (7.8%) patients (Table 2).

Condition	Frequency (n)	Percentage (%)
Acute headache syndromes	219	71.3
Acute ischemic stroke	64	20.8
Seizure / epilepsy emergencies	24	7.8
Total	307	100.0

TABLE 2: Spectrum of neurological emergency presentations (n = 307)

Among the 219 patients presenting with acute headache, no secondary causes, including subarachnoid hemorrhage, meningitis, hypertensive emergency, or other secondary headache disorders, were identified during the emergency evaluation. Among the 64 patients with acute ischemic stroke/TIA, NIHSS scores were available for 58 (90.6%) and unavailable for six (9.4%). Among those with available scores, 26 patients (44.8%) had minor deficits, 18 (31.0%) had mild deficits, eight (13.8%) had moderate deficits, four (6.9%) had moderate-to-severe deficits, and two (3.4%) had severe deficits. Overall, 44 patients (75.9%) had minor-to-mild neurological deficits, whereas 14 (24.1%) had moderate-to-severe or severe deficits (Table 3).

NIHSS category	Score range	Frequency (n)	Percentage (%)
Minor stroke	1–4	26	44.8
Mild stroke	5–9	18	31.0
Moderate stroke	10–15	8	13.8
Moderate-severe stroke	16–20	4	6.9
Severe stroke	21–42	2	3.4
Total documented NIHSS	—	58	100

TABLE 3: National Institutes of Health Stroke Scale (NIHSS) severity classification in stroke patients

No cases of subarachnoid hemorrhage, meningitis, or other secondary headache disorders were identified after completion of the emergency diagnostic evaluation during the study period.

Neuroimaging findings showed anterior circulation infarction in 18 patients (28.1%), posterior circulation infarction in 14 (21.9%), and deep or lacunar infarction in 10 (15.6%). No acute infarction was identified, or TIA was suspected in 16 (25%) patients, while four (6.3%) had an unspecified infarct location and two (3.1%) had a vascular variant or incidental abnormality (Table 4).

Imaging category	Frequency (n)	Percentage %
Anterior circulation infarct (MCA/ACA)	18	28.1
No acute infarct / TIA suspected	16	25.0
Posterior circulation infarct (PCA/brainstem/cerebellar)	14	21.9
Deep/lacunar infarct (BG/IC/thalamus)	10	15.6
Ischemic infarct – location unspecified	4	6.3
Vascular variant/abnormality reported	2	3.1
Total	64	100.0

TABLE 4: Standardized neuroimaging findings (CT/MRI) in acute ischemic stroke (n = 64)

MCA/ACA: middle cerebral artery/anterior cerebral artery, TIA: transient ischemic attack, PCA: posterior cerebral artery, BG/IC: basal ganglia/internal capsule

Functional outcomes at discharge are presented in Table 5 and Table 6. An mRS score of 0 was observed in eight patients (12.5%), 1 in 16 (25.0%), 2 in 20 (31.3%), 3 in 10 (15.6%), 4 in six (9.4%), 5 in two (3.1%), and 6 in two (3.1%) (Table 5).

Discharge mRS Score	Frequency (n)	Percentage (%)
0	8	12.5
1	16	25.0
2	20	31.3
3	10	15.6
4	6	9.4
5	2	3.1
6	2	3.1
Total	64	100.0

TABLE 5: Distribution of modified Rankin Scale (mRS) scores at discharge (n = 64).

Overall, 44 patients (68.8%) had a favorable functional outcome, defined as mRS 0-2, while 20 (31.2%) had an unfavorable outcome, defined as mRS 3-6 (Table 6).

Outcome category	Definition	Frequency (n)	Percentage (%)
Favorable outcome	mRS 0–2	44	68.8
Poor outcome	mRS 3–6	20	31.2
Total	—	64	100.0

TABLE 6: Categorization of functional outcome based on the modified Rankin Scale (n = 64)

The NIHSS was positively correlated with discharge mRS (Spearman's rho = 0.640, $p < 0.001$), indicating that greater neurological deficit severity was associated with worse functional status at discharge (Table 7).

Variables	Spearman's ρ (r)	p-value
NIHSS score and discharge mRS	0.640	<0.001

TABLE 7: Correlation between the NIHSS score and discharge mRS

NIHSS: National Institutes of Health Stroke Scale, mRS: modified Rankin Scale

Comparative analysis demonstrated significant differences among the three diagnostic groups in age, sex, neuroimaging utilization, and tertiary-care transfer (Table *8*). Patients with acute ischemic stroke/TIA were older than those with seizure-related emergencies and acute headache (58.4 ± 14.2, 38.5 ± 14.2, and 41.2 ± 11.8 years, respectively; $F(2, 304) = 47.82$, $p < 0.001$, $\eta^2 = 0.239$). Males accounted for 44 (68.8%) patients with stroke/TIA, compared with 13 (54.2%) with seizure-related emergencies and 94 (42.9%) with acute headache ($\chi^2(2, N = 307) = 16.34$, $p < 0.001$, Cramér's V = 0.231). Neuroimaging was performed in 61 (95.3%), 18 (75.0%), and 62 (28.3%) patients, respectively ($\chi^2(2, N = 307) = 112.47$, $p < 0.001$, Cramér's V = 0.605), while tertiary-care transfer occurred in 22 (34.4%), 4 (16.7%), and 2 (0.9%) patients, respectively ($\chi^2(2, N = 307) = 68.91$, $p < 0.001$, Cramér's V = 0.474).

Variable	Acute stroke (n = 64)	Seizure (n = 24)	Headache (n = 219)	p-value
Mean age, years (±SD)	58.4 ± 14.2	38.5 ± 14.2	41.2 ± 11.8	<0.001*
Male sex, n (%)	44 (68.8%) (56.6–78.8%)	13 (54.2%) (35.1–72.1%)	94 (42.9%) (36.5–49.5%)	<0.001#
Neuroimaging performed, n (%)	61 (95.3%) (87.1–98.4%)	18 (75.0%) (55.1–88.0%)	62 (28.3%) (22.8–34.6%)	<0.001#
Tertiary transfer, n (%)	22 (34.4%) (23.9–46.6%)	4 (16.7%) (6.7–35.9%)	2 (0.9%) (0.3–3.3%)	<0.001#
Favorable outcome (mRS 0–2), n (%)	44 (68.8%) (56.6–78.8%)	N/A	N/A	—

TABLE 8: Comparative characteristics across the diagnostic groups

* One-way ANOVA test for continuous variables (age); $F(2, 304) = 47.82$, $p < 0.001$, $\eta^2 = 0.239$. # Pearson chi-square test for categorical variables; sex: $\chi^2(2, N = 307) = 16.34$, $p < 0.001$, Cramér's V = 0.231; neuroimaging: $\chi^2(2, N = 307) = 112.47$, $p < 0.001$, Cramér's V = 0.605; tertiary transfer: $\chi^2(2, N = 307) = 68.91$, $p < 0.001$, Cramér's V = 0.474.

SD: standard deviation, mRS: modified Rankin Scale, N/A: not applicable

Discussion

The functional outcome component is therefore a substudy of the stroke/TIA group rather than a cohort-wide finding. This study is a retrospective analysis of the spectrum, neuroimaging features, and short-term functional outcomes of 307 adult neurological emergencies treated at a secondary-care hospital in Abu Dhabi over the last 36 months. It appears that the clinically heterogeneous and broad caseload of neurological emergencies can be safely managed in secondary-care hospitals using a protocol-driven approach and a referral network.

Because 71.3% is a proportion of neurological emergency presentations rather than of all ED attendances, it is not directly comparable to all-ED headache prevalence estimates; the figure reflects the case mix of a referral-based secondary facility. The structured diagnostic protocols, including the use of risk-stratification tools (e.g., the Ottawa SAH rule) to exclude secondary causes of headache, are recommended by international guidelines in emergency neurology [1,16,17].

The proportion of acute ischemic stroke (20.8%) is in agreement with the data of the Gulf stroke registries. According to Gulf RACE-2, ischemic stroke is the main acute cerebrovascular event in hospitals in Gulf Cooperation Council (GCC) countries, where the delayed presentation outside the thrombolysis window is the leading barrier to reperfusion therapy. Thrombolysis rates and door-to-needle times were not captured as variables in this dataset. Based on regional registry data, delayed presentation outside the thrombolysis window is the most plausible explanation for low reperfusion therapy use in comparable settings, though this could not be directly assessed in the current cohort [3,4,18].

The neuroimaging features of acute ischemic stroke are consistent with the literature, in which anterior circulation infarcts predominate, followed by posterior circulation and lacunar infarcts. The relatively high

proportion of posterior circulation infarctions should be emphasized, as they are more difficult to diagnose in pre-hospital and early ED settings [19-21].

Most short-term outcomes were favorable, similar to those reported in other cohorts of secondary-care stroke patients in the Middle East. The studies suggest that the baseline NIHSS score has proven to be a valid predictor of short-term functional outcome, as measured by the mRS. The significant positive association between NIHSS severity and discharge mRS in the current study indicates the prognostic value of early assessment of stroke severity in a secondary-care hospital without on-site neurology [22,23]. The correlation between the NIHSS and discharge mRS ($\rho = 0.640$, $n = 58$) is reported as an exploratory association within the stroke subgroup and should not be interpreted as a validated prediction model.

This study directly addresses a notable deficit in regional clinical data by mapping out how acute neurological presentations actually manifest and fare within a secondary-care framework in the United Arab Emirates. Ultimately, these findings will help us frame a realistic benchmark for frontline health teams managing neurological emergencies outside major tertiary stroke centres.

Limitations

There were several limitations inherent to this study. First, it relies strictly on historical electronic medical records, introducing vulnerability to documentation variations and incomplete data logging; this was particularly notable for baseline NIHSS scores, which emergency physicians occasionally quantified before neurology consultation. Second, this reflects a single-centre experience at an isolated secondary facility; these epidemiological trends and outcome matrices may not be fully generalizable to other secondary-care hospitals across the Gulf region. Third, the study was subjected to an unavoidable referral bias, as hyper-acute or profoundly unstable patients requiring immediate advanced neurointerventional therapies were routinely transferred to tertiary centres directly from triage, potentially underestimating the true prevalence of maximum-severity presentations. There were missing data on baseline stroke severity scores in a few records, which impeded subgroup analysis. Finally, evaluating functional outcomes using the mRS strictly at the time of hospital discharge captures only short-term status, precluding definitive conclusions about sustained 90-day, six-month, or one-year neurological recovery and long-term functional trajectories. Nationality was used as a proxy for ethnicity; self-reported race/ethnicity was not systematically recorded, which limits cross-study comparability.

Conclusions

In this single-centre retrospective cohort of 307 adults presenting to a secondary-care hospital in Abu Dhabi with one of four selected neurological emergencies, acute headache syndromes predominated, followed by acute ischemic stroke/TIA and seizure-related emergencies. Among stroke/TIA patients, most had minor-to-mild deficits at presentation and most achieved functional independence (mRS 0-2) at discharge; NIHSS severity was associated with discharge mRS, although this association was unadjusted and exploratory. Because safety and process measures (door-to-imaging time, thrombolysis/thrombectomy rates, early neurological deterioration, complications, and readmission) were not captured, this study cannot establish that the pathway is "safe"; it can only describe case mix, severity, imaging patterns, and short-term discharge status. A third of stroke patients required transfer to a tertiary centre, underscoring that definitive stroke care is not available on site. Prospective, multicentre studies with process and safety endpoints and longer-term follow-up are required before protocol-driven secondary-care management of neurological emergencies can be endorsed as safe and effective.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. AlDhafra Hospitals Research Ethics Committee (ADHREC) issued approval ADH REC 200526D. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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