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Stroke patients in an alcohol withdrawal state: A cross-sectional analysis of clinical profiles and functional outcomes in a tertiary hospital in the Philippines

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Abstract

Background & Objective: Acute stroke patients are at risk for a wide range of complications. When these complications overlap with acute Alcohol Withdrawal Syndrome (AWS), they can lead to adverse events such as death, disability, or delayed recovery. However, evidence regarding this overlap, particularly in Asian populations, is scarce. This study aims to characterize the clinicodemographic features and outcomes of Filipino stroke patients with AWS and investigate the relationship between AWS severity and functional recovery. *Methods:* We conducted a retrospective, cross-sectional study of adult stroke patients with AWS admitted to the Department of Neurology at a tertiary hospital from 2018 to 2023. Demographic data, clinical features, complications, and outcomes were collected. Associations between AWS severity (Clinical Institute Withdrawal Assessment of Alcohol Scale–Revised [CIWA-Ar]), stroke severity (National Institutes of Health Stroke Scale [NIHSS]), and functional outcomes (modified Rankin Scale [mRS]) were analyzed using Spearman's rho correlation and Fisher's exact test. *Results:* During the study period, 36 patients met the inclusion criteria. There was a strong male predominance (94.4%), with the majority aged 40–59 years (77.8%). Hemorrhagic stroke was the most common subtype (83.3%). Upon admission, 47.2% presented with mild AWS, and 55.6% manifested withdrawal symptoms within 24 hours to one week of admission. The mortality rate was 22.2% (95% CI: 10.1–39.2%), while 25.0% (95% CI: 12.1–42.2%) of patients were discharged with no significant disability (mRS 0–2). A significant positive correlation was found between AWS severity (CIWA-Ar scores) and functional disability (mRS) ($\rho = 0.360$, $p = 0.031$). Baseline demographic factors did not show a statistically significant association with functional outcomes.
Conclusion: Increasing severity of alcohol withdrawal is significantly associated with poorer functional outcomes in acute stroke patients. These findings emphasize the need for early risk stratification using the CIWA-Ar scale and the implementation of multidisciplinary management protocols to optimize recovery in this vulnerable population.

Keywords: Acute stroke, alcohol withdrawal syndrome, CIWA-Ar

INTRODUCTION

Alcohol use is a major global health concern, ranking seventh among the leading causes of death and disability.[1] In the context of cerebrovascular disease, the relationship between alcohol consumption and stroke is complex. While light-to-moderate consumption may offer some protective effects for ischemic stroke, heavy drinking is linearly associated with an increased risk of hemorrhagic stroke.[2–4]

In the clinical setting, a significant proportion of stroke patients are heavy alcohol users. A U.S. study noted that over 40% of acute ischemic stroke cases between 2004 and 2014 involved alcohol abuse.[5] Crucially, nearly half of these patients experience withdrawal symptoms when their intake is abruptly curtailed due to

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hospitalization.[5] The mandatory abstinence enforced by acute illness and hospitalization can precipitate Alcohol Withdrawal Syndrome (AWS), creating a "second hit" that complicates the acute stroke course.

When acute stroke is compounded by AWS, patients face a heightened risk of severe complications, including delirium tremens, seizures, and hemodynamic instability.[6] These complications are linked to increased morbidity, prolonged hospitalization, delayed rehabilitation, and higher mortality rates.[5]

Despite the high burden of stroke in the Philippines[7], data regarding the overlap of stroke and AWS in Asian populations are scarce. Most epidemiological studies on this topic are derived from Western populations. Furthermore, in resource-limited settings like the Philippines, the assessment and management of concurrent AWS are often constrained by financial limitations and a lack of standardized protocols.

This study, the Stroke Patients in an Alcohol Withdrawal State (SPAWS) Study, aims to bridge this knowledge gap. We investigated the clinicodemographic characteristics of Filipino stroke patients with AWS and analyzed the association between withdrawal severity and functional outcomes. The findings aim to inform the development of clinical guidelines to optimize diagnostics, prevent treatment delays, and improve outcomes in this high-risk group.

METHODS

This retrospective, cross-sectional study analyzed adult patients (≥18 years) admitted to a tertiary hospital (January 2018–October 2023) with acute stroke (ischemic or hemorrhagic) and concurrent AWS. We utilized total enumeration sampling to identify cases via relevant ICD-10 codes from medical records. Exclusion criteria included chronic stroke, elective admissions, and unrelated substance or psychiatric disorders.

Data on demographics, clinical profiles (including NIHSS), and AWS severity (CIWA-Ar) were extracted. The primary outcome was functional status (modified Rankin Scale) at discharge and 90 days; secondary outcomes included complications and mortality.

Statistical analyses were performed using IBM SPSS Statistics version 23. We calculated descriptive statistics with 95% confidence intervals (Clopper-Pearson method). Associations were assessed using Fisher's Exact Test, correlations with Spearman's rho, and component analysis via Wald tests (significance set at $p<0.05$).

RESULTS

During the study period, 5,211 stroke patients were admitted, of whom 1,239 (23.8%) had alcohol-related disorders. A total of 36 patients met the specific inclusion criteria for acute stroke with concurrent AWS and were included in the final analysis.

The cohort showed a strong male predominance (94.4%), with the majority aged 40–59 years (77.8%). Hemorrhagic stroke was the dominant stroke subtype, accounting for 83.3% (95% CI: 67.2–93.6%) of cases (n=30), while ischemic stroke accounted for 16.7% (n=6). Hypertension was the most common comorbidity, present in 77.8% (n=28) of patients.

Most patients (83.3%) were classified as moderate-to-intermediate drinkers prior to admission. In terms of withdrawal timeline, 55.6% (n=20) developed symptoms between 24 hours and 1 week of admission. Based on the CIWA-Ar score at admission, 47.2% (n=17) had mild withdrawal (<10 points), 33.3% (n=12) had moderate withdrawal (10–15 points), and 19.4% (n=7) had severe withdrawal (>15 points). The full demographic and clinical profile is detailed in Table 1.

Clinical Outcomes and Complications Outcomes are summarized in Table 2. The in-hospital mortality rate was 22.2% (95% CI: 10.1–39.2%, n=8). Conversely, 25.0% (95% CI: 12.1–42.2%, n=9) of patients were discharged with no significant disability (mRS 0–2).

Pneumonia was the most common complication, occurring in 44.4% (95% CI: 27.9–61.9%, n=16) of patients. Hypokalemia was observed in 50.0% (n=18). The majority of patients (75.0%) required ICU admission for ≤1 week. Pharmacologic management involved anticonvulsants (88.9%), neuroleptics (58.3%), and sympatholytics (47.2%). Surgical interventions, such as decompressive hemicraniectomy or hematoma evacuation, were performed in 25% of the cohort.

Associations and Correlations Fisher's Exact Test revealed no statistically significant association between baseline demographic factors (age, sex), alcohol withdrawal timeline, or initial stroke severity (NIHSS) and the final functional outcome (mRS), as shown in Table 3. Stroke classification approached significance (p=0.161) but did not reach the threshold.

Table1 : Clinico-demographic profiles of acute stroke patients with alcohol withdrawal (n=36)

Clinico-Demographic Variables	Frequency (n)	Percentage (%)
Age		
20-39 years old	6	16.7
40-59 years old	28	77.8
> 60 years old	2	5.6
Gender		
Male	34	94.4
Female	2	5.6
Alcohol withdrawal timeline upon admission		
6 to 24 hours	13	36.1
24 hours to 1 week	20	55.6
At least 1 week	3	8.3
Level of Withdrawal (CIWA-Ar score)		
Mild withdrawal (< 10 points)	17	47.2
Moderate withdrawal (10-15 points)	12	33.3
Severe withdrawal (> 15 points)	7	19.4
Degree of alcohol consumption		
Moderate to Intermediate	30	83.3
Heavy	6	16.7
Stroke Classification		
Hemorrhagic	30	83.3
Ischemic	6	16.7
NIHSS upon admission		
Minor stroke (1-4 points)	9	25.0
Moderate stroke (5-15 points)	13	36.1
Moderate/severe stroke (16-20 points)	7	19.4
Severe stroke (> 20 points)	7	19.4
Comorbidities		
Hypertension	28	77.8
Dyslipidemia	3	8.3
Diabetes	3	8.3
Liver Cirrhosis	2	5.6
Asthma	2	5.6
Cholelithiasis	2	5.6
None	3	8.3

Table 2: Clinical outcomes of acute stroke patients with alcohol withdrawal

Outcome Variables	Frequency (n)	Percentage (%)
mRS at discharge		
No significant disability (0-2)	9	25.0
Slight to Severe disability (3-5)	13	36.1
Dead (6)	8	22.2
mRS at 90 days		
No significant disability (0-2)	10	27.8
Slight to Severe disability (3-5)	10	27.8
Dead (6)	8	22.2
Length of Hospital Stay		
At most 1 week	10	27.8
1 to 2 weeks	20	55.6
> 2 weeks	6	16.7
Length of ICU Stay		
At most 1 week	27	75.0
> 1 week	8	22.2
Complications		
Pneumonia (Hospital Acquired)	16	44.4
Hypokalemia	18	50.0
Upper Gastrointestinal Bleeding	4	11.1
None	10	27.8
Medical Management		
With anticonvulsants medications	32	88.9
With neuroleptics/ antipsychotics	21	58.3
With sympatholytics	17	47.2
Surgical Intervention		
Decompressive hemicraniectomy	3	8.3
Tube ventriculostomy	3	8.3
Craniotomy (Hematoma Evacuation)	3	8.3

Table 3: Association between clinico-demographic profiles and modified Rankin Score (mRS)

Clinico-Demographic Profile	Fisher's Exact Test Value	p-value
Age	11.860	0.115
Sex	3.700	0.886
Alcohol withdrawal timeline	6.178	0.898
Level of Withdrawal upon admission	11.948	0.734
Degree of alcohol consumption	3.369	0.694
Stroke Classification	6.409	0.161
NIHSS upon admission	16.336	0.243

However, Spearman correlation analysis demonstrated a significant positive correlation between AWS severity (CIWA-Ar score) and functional disability (mRS) (ρ = 0.360, p = 0.031) (Table 4). This indicates that patients with higher CIWA-Ar scores (more severe withdrawal) experienced significantly worse functional outcomes.

Further analysis of individual CIWA-Ar components (e.g., tremors, agitation) using regression modeling did not identify any single symptom as an independent predictor of outcome (all p>0.05), suggesting that the cumulative withdrawal burden drives the clinical impact (Table 5).

DISCUSSION

This study highlights the clinical burden of AWS in Filipino stroke patients. Our cohort was predominantly male and middle-aged, consistent with global trends regarding alcohol consumption patterns.[11] A striking finding in our study was the high prevalence of hemorrhagic stroke (83.3%). This aligns with literature suggesting that while light alcohol consumption may be protective against ischemic stroke, heavy consumption is a potent risk factor for intracerebral hemorrhage due to alcohol-induced hypertension and coagulopathy.[12,13]

Table 4: Correlation of mRS score and CIWA-Ar score

Variables	Spearman-rho Correlation Coefficient	p-value
Modified Rankin Score (mRS) vs CIWA-Ar	0.360	0.031

The most significant finding of the SPAWS study is the direct correlation between AWS severity and functional disability (p=0.031). Patients with higher CIWA-Ar scores had worse mRS scores at discharge. Severe AWS triggers a hyperadrenergic state (autonomic storm), leading to hypertension, tachycardia, and electrolyte imbalances (e.g., hypokalemia was seen in 50% of our patients). In the context of acute stroke, these systemic stressors can exacerbate cerebral edema, increase intracranial pressure, and expand the penumbra or hematoma, thereby worsening neurological recovery.[14,15]

Patients with severe AWS had prolonged hospitalizations. This is consistent with findings by Akano *et al*., who noted that AWS is an independent predictor of longer length of stay and higher costs.[5] The high rate of pneumonia

Table 5: Correlation of modified Rankin Score and CIWA-Ar score components

CIWA-Ar Components	Wald Test Coefficient	p-value	R^2
Nausea and Vomiting	0.019	0.890	0.409
Tremor	0.482	0.487	
Paroxysmal sweats	2.300	0.129	
Anxiety	0.203	0.652	
Agitation	0.430	0.512	
Tactile Disturbance	1.894	0.169	
Auditory Disturbance	1.038	0.308	
Visual Disturbances	2.999	0.083	
Headache	0.855	0.355	
Orientation and Clouding	0.035	0.851	

(44.4%) in our cohort is likely multifactorial, resulting from a combination of AWS-induced delirium (requiring sedation or restraints), stroke-induced dysphagia, and immobility.[16]

The lack of correlation between baseline demographics and outcome suggests that AWS itself is a modifiable risk factor that independently influences prognosis. This emphasizes the critical need for: 1) Early screening: Routine screening for alcohol use history in all stroke admissions. 2) Protocolized assessment: Use of the CIWA-Ar scale to stratify risk early. 3) Proactive management: Aggressive treatment of withdrawal symptoms using symptom-triggered benzodiazepines or other agents to prevent the progression to delirium tremens.[17]

The primary limitation of this study is the small sample size (n=36) and the single-center, retrospective design, which limits generalizability. Additionally, the high proportion of hemorrhagic strokes may reflect the referral bias of a tertiary center receiving severe cases. The retrospective nature may introduce information bias regarding alcohol consumption patterns. Future multi-center prospective studies are recommended to validate these findings.

In conclusion, in this cohort of Filipino patients, AWS was associated with significant morbidity. While baseline demographics did not predict recovery, the severity of alcohol withdrawal was significantly correlated with poorer functional outcomes. These results advocate for the integration of standardized AWS management protocols using CIWA-Ar into acute stroke care to mitigate complications and improve patient recovery.

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DISCLOSURE

Ethics: This study was approved by the Institutional Review Board and Ethics Committee of Baguio General Hospital and Medical Center (Approval No. BGHMC-ERC-2022-97).

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