Section: Medicine

Original Research Article

ASSESSMENT OF GLYCEMIC STATUS IN ACUTE STROKE AND ITS CORRELATION WITH CLINICAL OUTCOME IN A TEACHING HOSPITAL

Safia Fatima[1], G Bhanu Prakash[2], Vijaya bhaskar Potuganti[3], Juhi Aggarwal[4], M Lakshmi Surya Prabha[5], Babulal S[6], Swarna Deepak Kuragayala[7], Munni Shaik[8], Mahaboob Vali Shaik[9]

[1]Assistant Professor, Department of General Medicine, Deccan College of Medical Sciences, Kanchanbagh, Hyderabad, Telangana, India
[2]Associate Professor, Department of Physiology, Anna Gowri Medical College and Hospital, Puttur, Andhra Pradesh, India
[3]Professor, Department of Anatomy, MNR Medical College and Hospital, Sangareddy, Hyderabad, India.
[4]Professor & HOD, Department of Biochemistry, Santosh Medical College and Hospital, Santosh Deemed to be University, Ghaziabad, U.P., India
[5]Addl DME, Director (Research & Development), Dr NTR University of Health Sciences, Vijayawada, Andhra Pradesh, India.
[6]Professor and HOD & Director (A&R), Department of Pulmonology, Nimra Institute of Medical Sciences, Vijayawada, India
[7]Professor, Department of Critical Care Medicine, Apollo Health City, Jubilee Hills, Hyderabad, Telangana. India
[8]Research Scientist, Department of Research & Development, Nimra Institute of Medical Sciences (Affiliated Dr NTR University of Health Sciences), Vijayawada, AP, India
[9]Research Coordinator, Department of Research & Development, Nimra Institute of Medical Sciences (Affiliated Dr NTR University of Health Sciences), Vijayawada, AP, India

Received *: 03/01/2026*
Received in revised form *: 07/02/2026*
Accepted *: 24/02/2026*

Corresponding Author:
Dr. Safia Fatima,
Assistant Professor, Department of General Medicine, Deccan College of Medical Sciences, Kanchanbagh, Hyderabad, Telangana, India.
Email: safiafatima190191@gmail.com

DOI: 10.70034/ijmedph.2026.1.449

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (1); 2604-2610

ABSTRACT

Background: Acute stroke is a leading cause of morbidity and mortality worldwide. Hyperglycemia at the time of stroke presentation, whether due to known diabetes, newly diagnosed diabetes, or stress response, has been associated with poor clinical outcomes. This study aimed to evaluate the glycemic status in patients with acute stroke and its association with stroke severity, lesion characteristics, and short-term clinical outcome.

Materials and Methods: This hospital-based prospective study included 158 patients presenting with acute stroke. Patients were categorized into four groups based on admission blood glucose levels; euglycemia, stress hyperglycemia, known diabetes, and newly diagnosed diabetes. Stroke severity was assessed using the National Institutes of Health Stroke Scale (NIHSS). CT brain imaging was used to determine stroke type and lesion size. Clinical outcomes were evaluated at 30 days and categorized as good, moderate, poor outcome, or death. Statistical analysis was performed using chi-square test and one-way ANOVA, with $p<0.05$ considered statistically significant.

Results: Of the 158 patients, 115 (72.7%) had ischemic stroke and 43 (27.3%) had hemorrhagic stroke. Hyperglycemia was observed in 88 patients (55.7%). Mean NIHSS score was significantly higher in hyperglycemic patients compared to euglycemics (19.4 ± 5.2 in stress hyperglycemia vs. 9.5 ± 6.7 in euglycemia; $p < 0.001$). Hyperglycemia was significantly associated with larger lesion size ($p < 0.001$) and higher proportion of hemorrhagic stroke ($p < 0.05$). Good functional outcome was seen predominantly in euglycemic patients (65.9%), whereas mortality was highest among newly diagnosed diabetics (52.6%), followed by known diabetics (40.0%) and stress hyperglycemia (34.1%). Overall, admission hyperglycemia was associated with significantly increased early mortality and poor functional recovery ($p < 0.001$).

Conclusion: Admission hyperglycemia is strongly associated with increased stroke severity, larger lesion size, and poor short-term clinical outcomes. Stress hyperglycemia and newly diagnosed diabetes were particularly linked to higher mortality. Early identification and optimal glycemic control may play a crucial role in improving outcomes in acute stroke patients.

Keywords: Acute stroke; Hyperglycemia; Stress hyperglycemia; Diabetes mellitus; NIHSS; Clinical outcome; Mortality.

INTRODUCTION

Stroke, also known as a cerebrovascular accident, is defined as the abrupt onset of a neurological deficit attributable to a focal vascular cause. The diagnosis of stroke is primarily clinical, supported by laboratory investigations and neuroimaging studies.[1] Stroke remains one of the leading causes of mortality and long-term disability worldwide.[2,3] Given its significant socioeconomic burden, improving our understanding of high-risk populations, associated complications, and prognostic indicators is essential.

Diabetes mellitus is a well-established risk factor for stroke. A substantial proportion of patients presenting with acute stroke are found to have hyperglycemia, even in the absence of a prior history of diabetes.[4] Studies have reported that approximately 11.3% of stroke patients have a history of diabetes compared to about 2% in the general population.[5] The prevalence of diabetes has been found to be nearly twice as high among patients admitted with stroke compared to those admitted with other neurological disorders. The increased risk and prevalence of stroke among diabetic individuals have been confirmed in large epidemiological studies.[6]

Both chronic hyperglycemia (as seen in diabetes) and stress-induced hyperglycemia are associated with increased stroke severity and poorer outcomes. Mortality following stroke in diabetic patients has been reported to be nearly twice that of the general population.[7] Glucose tolerance also deteriorates with advancing age, further increasing susceptibility.[8] Multivariate analyses have demonstrated that elevated blood glucose levels are independent predictors of mortality in stroke patients.[9]

Diabetic macrovascular complications—including coronary artery disease, stroke, and peripheral vascular disease—are major causes of morbidity and mortality among individuals with diabetes mellitus.[10] In non-diabetic patients, hyperglycemia following acute stroke is often interpreted as a stress response reflecting greater neurological injury. However, increasing evidence suggests that hyperglycemia itself may independently worsen stroke outcomes, rather than merely serving as a marker of stroke severity.

Elevated blood glucose levels at the time of cerebral ischemia have been associated with increased infarct size, greater neuronal damage, and delayed functional recovery. Even mild hyperglycemia (≥6.6 mmol/L) has been shown to exacerbate brain injury. Experimental studies in animal models have demonstrated that insulin administration improves functional recovery following cerebral ischemia, possibly by modulating glucose and lactate metabolism.[11]

Stress-induced hyperglycemia is increasingly recognized as a non-benign condition and has been associated with higher mortality following acute stroke.[12] Despite these observations, the relationship between admission glucose levels and stroke outcomes remains an area of ongoing research. Therefore, the present study has been undertaken to objectively evaluate glycemic status in patients with acute stroke and to assess its association with clinical outcomes.

AIM

Therefore, the present study has been undertaken to objectively evaluate glycemic status in patients with acute stroke and to assess its association with clinical outcomes.

MATERIALS AND METHODS

Study Design: Hospital-based prospective observational study.

Study Setting: Department of General Medicine, Deccan College of Medical Sciences, Hyderabad.

Study Duration: January 2024 to December 2025.

Sample Size: A total of 158 patients (calculated sample size) were included in the study.

Study Population: Patients admitted to the Department of General Medicine with acute stroke who fulfilled the inclusion criteria and provided written informed consent.

Inclusion Criteria

1. Age > 40 years
2. Admission within 24 hours of onset of stroke
3. New-onset cerebrovascular accident
4. Blood glucose measured within 24 hours of stroke onset
5. Stroke amenable to medical management (antiplatelets, anticoagulants, neuroprotective therapy, supportive care)

Exclusion Criteria

1. Admission after 24 hours of stroke onset
2. Prior intravenous glucose administration
3. Stroke requiring thrombolysis or surgical intervention (decompression, embolectomy)
4. Massive infarct/haemorrhage, tumors, hydrocephalus
5. Systemic complications requiring intensive care

Methodology

Sample Selection: 158 patients were selected using a randomized table method. Written informed consent was obtained after explaining the study details.

Evaluation: All patients underwent detailed history taking and clinical examination, including blood pressure measurement. Laboratory investigations included blood glucose, urea, creatinine, electrolytes, hemoglobin, total and differential leukocyte count, and urine analysis. Electrocardiography, chest X-ray, CT scan of the brain, and 2D echocardiography were performed in all patients. Stroke severity was assessed using the NIH Stroke Scale (NIHSS) on admission (Day 1) and reassessed on Day 15, with a maximum possible score of 30.

Outcome was classified as:

- Good prognosis

- Moderate prognosis
- Poor prognosis
- Death

Glycemic Classification: Venous blood samples were collected within 24 hours of symptom onset for glucose estimation. Patients were categorized into four groups based on admission blood sugar and HbA1c levels: euglycemic (blood glucose <110 mg/dL), known diabetics, newly diagnosed diabetics (blood glucose >110 mg/dL with HbA1c >6.4%), and stress hyperglycaemia (blood glucose >110 mg/dL with HbA1c <6.4%).

Radiological Evaluation: CT brain was performed to confirm diagnosis, differentiate ischemic from hemorrhagic stroke, determine lesion size and location, and detect complications such as cerebral edema or midline shift. Lesions were classified as small (<5 mm), medium (5–10 mm), or large (>10 mm or involving multiple vascular territories).

Outcome Assessment: Clinical outcomes were categorized as good, moderate, poor, or death based on functional recovery and independence in activities of daily living.

Data Analysis: Data were entered into MS Excel and analyzed using SPSS version 23. Categorical variables were expressed as percentages, and continuous variables were presented as mean ± standard deviation. Chi-square test was used for categorical data, and unpaired t-test for continuous data. A p-value <0.05 was considered statistically significant.

RESULTS

Table 1: Baseline Characteristics, Risk Factors, Clinical Presentation, Glycemic Status and Stroke Severity of Study Population

Variable	Category	Male n (%)	Female n (%)	Total n (%) / Mean
Age (years)	41–50	26	6	32 (20.3%)
	51–60	44	16	60 (37.9%)
	61–70	14	18	32 (20.3%)
	71–80	16	14	30 (18.9%)
	>80	4	0	4 (2.6%)
	Total	106	52	158 (100%)
Overall Gender Distribution	Male	—	—	104 (65.8%)
	Female	—	—	54 (34.2%)
Risk Factors	Hypertension	66 (63.6%)	38 (36.4%)	104 (65.8%)
	Smoking	63 (100%)	0	63 (39.8%)
	Diabetes	27 (60.7%)	17 (39.3%)	44 (27.8%)
	Alcohol	39 (96.1%)	2 (3.9%)	41 (25.9%)
	Hypercholesterolemia	16 (71.4%)	6 (28.6%)	22 (13.9%)
	Atrial Fibrillation	0	2 (100%)	2 (1.26%)
	Coronary Artery Disease	6 (66.6%)	3 (33.3%)	9 (5.69%)
Clinical Presentation	Right Hemiplegia	60 (69.1%)	27 (30.9%)	87 (55%)
	Left Hemiplegia	39 (64.1%)	22 (35.9%)	61 (38.6%)
	Faciobrachial Monoplegia	3 (37.5%)	5 (62.5%)	8 (5%)
	Cerebellar Symptoms	2 (100%)	0	2 (1.26%)
	Loss of Consciousness	49 (60.8%)	31 (39.2%)	80 (50.6%)
	Hemianopia	3 (60%)	2 (40%)	5 (3.16%)
	Aphasia	35 (58.3%)	25 (41.6%)	60 (37.9%)
	Bladder & Bowel Involvement	25 (59.6%)	17 (40.4%)	42 (26.5%)
Glycemic Status	Euglycemia	—	—	70 (44.3%)
	Stress Hyperglycemia	—	—	44 (27.8%)
	Known Diabetes	—	—	25 (15.9%)
	Newly Diagnosed Diabetes	—	—	19 (12.0%)
Stroke Severity (NIHSS on Admission)	Euglycemia	—	—	9.5 (Mean)
	Stress Hyperglycemia	—	—	19.4 (Mean)
	Known Diabetes	—	—	17.3 (Mean)
	Newly Diagnosed Diabetes	—	—	16.3 (Mean)

Table 2: Stroke Severity According to Glycemic Status (NIHSS on Admission)

Glycemic Status	n	Mean NIHSS	SD
Euglycemia	70	9.50	6.760
Stress Hyperglycemia	44	19.40	5.248
Known Diabetes	25	17.30	6.561
Newly Diagnosed Diabetes	19	16.30	7.040

One-way ANOVA: $F = 401.1$, $p < 0.001$

(Significant difference in stroke severity across glycemic groups)

Table 3: Association of Glycemic Status with Stroke Characteristics (Type and Lesion Size) (n=158)

A. Type of Stroke			
Glycemic Status	**Ischemic n (%)**	**Hemorrhagic n (%)**	**Total**
Euglycemia (70)	54 (77.1%)	16 (22.9%)	70
Stress Hyperglycemia (44)	36 (81.8%)	8 (18.2%)	44
Known Diabetes (25)	15 (60.0%)	10 (40.0%)	25
Newly Diagnosed Diabetes (19)	10 (52.7%)	9 (47.3%)	19
Total (158)	115 (72.7%)	43 (27.3%)	158
Chi-square = 8.44, df = 3, $p < 0.05$			

B. Lesion Size Distribution				
Glycemic Status	**Small n (%)**	**Medium n (%)**	**Large n (%)**	**Total**
Euglycemia	46 (65.7%)	13 (18.6%)	11 (15.7%)	70
Stress Hyperglycemia	2 (4.5%)	22 (50.0%)	20 (45.5%)	44
Known Diabetes	3 (12.0%)	13 (52.0%)	9 (36.0%)	25
Newly Diagnosed Diabetes	0 (0%)	10 (52.6%)	9 (47.4%)	19
Total	51 (32.2%)	58 (36.8%)	49 (31.0%)	158
Chi-square = 65.42, df = 6, $p < 0.001$				

Table 4: Association Between Glycemic Status and Clinical Outcome (n=158)

Glycemic Status	**Good n (%)**	**Moderate n (%)**	**Poor n (%)**	**Death n (%)**	**Total**
Euglycemia (70)	46 (65.9%)	9 (12.9%)	7 (10.0%)	8 (15.9%)	70
Stress Hyperglycemia (44)	3 (6.8%)	14 (31.8%)	12 (27.3%)	15 (34.1%)	44
Known Diabetes (25)	2 (8.0%)	8 (32.0%)	5 (20.0%)	10 (40.0%)	25
Newly Diagnosed Diabetes (19)	0 (0%)	3 (15.8%)	6 (31.6%)	10 (52.6%)	19
Total (158)	51 (32.2%)	34 (21.5%)	30 (18.9%)	43 (27.2%)	158
Chi-square = 69.3, df = 9, $p < 0.001$					

Table 5: Outcome Distribution Within Stroke Subtypes and Sugar Categories

A. Hemorrhagic Stroke (n = 43)					
Glycemic Status	**Good**	**Moderate**	**Poor**	**Death**	**Total**
Euglycemia	4	5	0	6	15
Stress Hyperglycemia	0	2	1	5	8
Known Diabetes	0	5	3	2	10
Newly Diagnosed Diabetes	0	3	5	2	10
Total	4	15	9	15	43
B. Ischemic Stroke (n = 115)					
Glycemic Status	**Good**	**Moderate**	**Poor**	**Death**	**Total**
Euglycemia	40	5	3	5	53
Stress Hyperglycemia	2	13	11	11	37
Known Diabetes	2	3	2	9	16
Newly Diagnosed Diabetes	0	0	1	8	9
Total	44	21	17	33	115

A total of 158 patients with acute stroke were included in the study. Among them, 115 (72.7%) had ischemic stroke and 43 (27.3%) had hemorrhagic stroke.

Glycemic Status and Type of Stroke: Ischemic stroke predominated in all glycemic groups; however, the proportion of hemorrhagic stroke was higher among patients with known diabetes (40.0%) and newly diagnosed diabetes (47.3%) compared to euglycemic (22.9%) and stress hyperglycemia (18.2%) groups. The association between glycemic status and type of stroke was statistically significant ($\chi^2 = 8.44$, $p < 0.05$).

Glycemic Status and Lesion Size: A significant association was observed between glycemic status and lesion size ($\chi^2 = 65.42$, $p < 0.001$). Small lesions were most common in euglycemic patients (65.7%), whereas large lesions were more frequent in newly diagnosed diabetes (47.4%) and stress hyperglycemia (45.5%). Medium-sized lesions were predominantly seen in newly diagnosed diabetes (52.6%) and known diabetes (52.0%).

Glycemic Status and Clinical Outcome: Clinical outcome showed a highly significant association with glycemic status ($\chi^2 = 69.3$, $p < 0.001$). Good outcome was predominantly observed in the euglycemic group (65.9%). In contrast, mortality was highest among newly diagnosed diabetics (52.6%), followed by known diabetics (40.0%) and stress hyperglycemia (34.1%). Poor and moderate outcomes were also more frequent among hyperglycemic groups compared to euglycemic patients.

Outcome According to Stroke Subtype: In hemorrhagic stroke, mortality was higher among stress hyperglycemia and diabetic groups, whereas in ischemic stroke, good outcome was predominantly seen in euglycemic patients. Newly diagnosed diabetics with ischemic stroke demonstrated a high proportion of mortality.

DISCUSSION

Age Distribution: In the present study, the majority of patients (60; 37.9%) were in the 51–60 years age group. This finding is consistent with studies by Topie E et al. and Kyadav K et al., which also reported a higher incidence of stroke in this age

group. Similarly, Singh KG et al. observed that 46% of stroke patients belonged to the 51–60 years category.[12-14]

However, some studies have reported a higher prevalence in the 41–50 years age group.[10] These variations may reflect demographic differences and evolving risk factor patterns.

Gender Distribution: The male-to-female ratio in our study was 1.92:1, indicating a clear male preponderance. Of the 158 patients, 65.8% were males. Similar male predominance was reported by Prasad BNR et al,[15] (1.38:1). Most epidemiological studies have demonstrated higher stroke incidence among males, possibly due to greater exposure to modifiable risk factors such as smoking and alcohol consumption.

Risk Factors in Relation to Gender: Hypertension was the most common risk factor, present in 104 patients (65.8%). Among these, males constituted 66 (63.6%) and females 38 (36.36%).

All smokers in our study were males (63; 39.8%), with no female smokers. Alcohol consumption was predominantly seen in males (39; 96.1%) compared to females (2; 3.85%), with an overall prevalence of 25.9%.

Diabetes mellitus was observed in 44 patients (27.8%), with a higher proportion in males (60.7%) than females (39.3%). Hypercholesterolemia was present in 13.9% of patients, again more common in males (71.4%) than females (28.56%).

O'Donnell MJ et al,[2] similarly demonstrated hypertension, smoking, diabetes mellitus, and alcohol intake as significant risk factors for stroke, reinforcing the findings of the present study.

Glycemic Status in the Study Population

Among 158 patients, 70 were euglycemic at admission. Elevated admission blood glucose levels were observed in:

- Newly diagnosed diabetes: 19 (12%)
- Known diabetes: 25 (15.9%)
- Stress hyperglycemia: 44 (27.8%) [Table 5]

Singh KG et al. reported a predominance of known diabetes (28%) in the hyperglycemic group.

The prevalence of known diabetes in our study was 15.9%, compared to 8.5% reported in some studiesand 17% in others. Kyadav K et al. reported a higher prevalence (24%).[13]

Newly diagnosed diabetes accounted for 12% in our study, which is comparable to previous reports showing 12–16% prevalence among acute stroke patients.[10,11] The prevalence of undiagnosed diabetes in acute stroke populations has been reported to range from 6% to 42%.[16]

Stress hyperglycemia was particularly prominent in ischemic stroke, affecting approximately one-third of patients, and one-fifth of those with hemorrhagic stroke.

Severity of Stroke (NIHSS Score): Stroke severity was assessed using the NIH Stroke Scale (NIHSS). Admission hyperglycemic patients had significantly higher NIHSS scores compared to euglycemic patients (17.27 vs. 9.5; p = 0.001) [Table 6]. Among hyperglycemic patients, stress hyperglycemia was associated with the highest NIHSS scores.

Similar findings were reported by Al-Weshshy A et al,[17] where hyperglycemic patients had significantly higher NIHSS scores (14.9 ± 5.9 vs. 7.8 ± 3.5; p = 0.000). Additionally, 30-day mortality was higher among stress hyperglycemic patients.

Size of Stroke Lesion: CT brain findings demonstrated that most euglycemic patients (46; 65.7%) had small-sized infarcts or hemorrhages [Table 9]. In contrast, admission hyperglycemic patients more frequently exhibited large lesions with edema and midline shift (p = 0.001).

Large lesions were particularly common among newly diagnosed diabetics (47.7%) and stress hyperglycemia patients (45.5%). Similar observations were made by Singh KG et al.

Type of Stroke: Among euglycemic patients, three-fourths had ischemic stroke and one-fourth had hemorrhagic stroke [Table 8]. In contrast, one-third of hyperglycemic patients had hemorrhagic stroke. Half of newly diagnosed diabetics presented with hemorrhagic stroke. This suggests a possible association between diabetes and increased hemorrhagic stroke risk.

Outcome of Stroke: Euglycemic patients demonstrated significantly better outcomes compared to admission hyperglycemic patients.

- 65% of euglycemic patients achieved good functional recovery.
- Only 3% of hyperglycemic patients showed good recovery at 30 days.

Early inpatient mortality was markedly higher in hyperglycemic patients (50%) compared to euglycemics (15%), representing a threefold increased mortality risk.

Several studies support these findings. Jorgensen H et al,[18] reported that plasma glucose >11 mmol/L was associated with increased hospital mortality. Capes SE et al,[19] in a meta-analysis of 32 studies, concluded that hyperglycemia was associated with a threefold increase in early mortality following ischemic stroke.

Glycemic Status and Clinical Outcome

In ischemic stroke:

- Early mortality: 9.43% (euglycemic) vs. 56.25% (hyperglycemic)
- Poor outcome: 5.66% vs. 12.5%

Stress hyperglycemia in non-diabetic ischemic stroke patients was associated with a 3.5-fold increased mortality risk compared to euglycemics.

These findings are consistent with Singh KG et al. and other reports. However, some studies did not find a significant increase in mortality among diabetics compared to non-diabetics.

Outcome According to NIHSS Score (Day 15)

Patients with:

- NIHSS <5 had good prognosis
- NIHSS 5–15 had moderate prognosis
- NIHSS 15–20 had poor prognosis
- NIHSS >20 had very high early mortality

This correlates with findings by Gajurel BP et al.20, demonstrating increasing mortality with higher NIHSS scores.

Lindsberg PJ and Roine RO reported hyperglycemia in 66% of ischemic stroke patients. Our study observed hyperglycemia in 56% overall and 53% of ischemic strokes.

Christensen H and Boysen G,[22] demonstrated higher stroke severity in hyperglycemic patients, similar to our findings (mean NIHSS 17.3 vs. 9.5).

Umpierrez GE et al,[23] reported higher mortality among newly detected hyperglycemic patients compared to known diabetics and normoglycemics.

Capes SE et al. confirmed that admission hyperglycemia is associated with a threefold increased 30-day mortality in ischemic stroke.

Vinychuk SM et al,[24] reported improved functional recovery with insulin therapy in mild-to-moderate ischemic stroke patients, although the overall benefit of intensive glucose control remains under investigation.

CONCLUSION

The present study demonstrates that glycemic status at admission has a significant association with stroke severity, lesion size, type of stroke, and short-term clinical outcome. Among the study population, the largest proportion of patients were euglycemic (44.3%), followed by those with stress hyperglycemia (27.8%), known diabetes, and newly diagnosed diabetes. Stroke severity, as measured by the NIH Stroke Scale (NIHSS), was significantly higher among stress hyperglycemic patients compared to other glycemic groups. These patients also demonstrated a higher frequency of large-sized lesions on neuroimaging.

Ischemic stroke was the predominant subtype across all glycemic categories, particularly among stress hyperglycemic patients. Mortality was highest among newly diagnosed diabetics and known diabetics, while stress hyperglycemia was frequently observed among fatal hemorrhagic stroke cases. Overall, admission hyperglycemia was strongly associated with increased early mortality and poorer functional recovery when compared to euglycemic patients.

The findings suggest that hyperglycemia in non-diabetic patients following acute stroke may represent a stress response reflecting more severe neurological injury. However, it also appears to independently contribute to adverse outcomes. Therefore, assessment and appropriate management of hyperglycemia should be considered an integral component of acute stroke care in both diabetic and non-diabetic patients.

RECOMMENDATIONS

Based on the findings of this study, larger multicentric studies are recommended to validate the association between admission glycemic status and stroke outcomes. Future research should explore the role of thrombolytic therapy in hyperglycemic stroke patients and assess whether early glucose-lowering strategies improve clinical outcomes. Intensive glucose control during the initial 72 hours of acute ischemic stroke may be considered, although further interventional trials are necessary to establish definitive guidelines. Frequent monitoring of blood glucose levels in the acute phase is essential to accurately determine glycemic status and ensure safe and effective management. Incorporating standardized glycemic management protocols into emergency stroke care may help improve prognosis in both diabetic and non-diabetic patients.

Limitations

The present study has certain limitations. The sample size was relatively small and drawn from a single center, which may limit the generalizability of the findings. None of the patients included in the study received thrombolytic therapy, which could have influenced clinical outcomes. Additionally, the study did not evaluate the impact of active glycemic control on patient prognosis. Long-term functional outcomes beyond 30 days were also not assessed. Further large-scale prospective studies are required to overcome these limitations and provide more definitive evidence.

REFERENCES

1. Smith WS, Joey D English, JhonstonSC . Cerebrovascular diseases. In: Kasper DL, Fauci AS, Longo DL, Hauser SL, James JL, Loscalzo J, editors. Harrison‘s Principles of Internal Medicine 18th ed. McGraw Hill, New York; 2010.pp. 3270-94.
2. O'Donnell MJ, Xavier D, Liu L, Zhang H, Chin SL, Rao-Melacini P, Rangarajan S, Islam S, Pais P, McQueen MJ, Mondo C. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. The Lancet. 2010 Jul 10;376(9735):112-23.
3. Krishnamurthi RV, Feigin VL, Forouzanfar MH, Mensah GA, Connor M, Bennett DA, Moran AE, Sacco RL, Anderson LM, Truelsen T, O'Donnell M. Global and regional burden of first-ever ischaemic and haemorrhagic stroke during 1990–2010: findings from the Global Burden of Disease Study 2010. The Lancet Global Health. 2013 Nov 1;1(5):e259-81.
4. King H, Aubert RE, Herman WH. Global burden of diabetes, 1995–2025: prevalence, numerical estimates, and projections. Diabetes care. 1998 Sep 1;21(9):1414-31.
5. Melamed E. Reactive hyperglycaemia in patients with acute stroke. Journal of the neurological sciences. 1976 Oct 1;29(2):267-75.
6. Frederic MW. Cerebrovascular disease. In: Cardiac and Vascular Disease Conn HLJR and Horwitzo (EDs.), Lea and Febiger, Philladelphia. 1971; 1473-99.
7. Wolf PA, Cobb JL, D‘ Agostine. Epidemiology of stroke. In: Barnett HJM and Mohr JP, editors. Stroke 2nd Edition. Churchill Livingstone, Edinburgh;1992.p 3-27.
8. Houseley E. Definition of risk factors in stroke. In: Gillingam FJ, Mawdsley C, Williams AE, editors. Stroke. New York, NY: Churchill Livingstone, Inc; 1976.p 251-60.
9. Davidson MB. The effect of aging on carbohydrate metabolism: a review of the English literature and a practical approach to the diagnosis of diabetes mellitus in the elderly. Metabolism. 1979 Jun 1;28(6):688-705.
10. Sharma AK, Mehrotra TN, Goel VK, Mitra A, Sood K, Nath M. Clinical profile of stroke in relation to glycaemic status of patients. The Journal of the Association of Physicians of India. 1996 Jan;44(1):19-21.

11. Joshi SR, Shah SN. Rising global burden of diabetes. The Asian Journal of Diabetology. 1996; 1 (3): 13-5.
12. Topie E, Pavlieek I, Bainer V. Glycosylated haemoglobin in classification of origin of hyperglycaemia in acute cerebrovascular accident. Diabetic Med 1989; 6: 12-15.
13. Kyadav K, Chaudhary HR, Gupta RC, Jain R, Yadav SR, Sharma S, Meena R. Clinical profile and outcome of stroke in relation to glycaemic status of patients. Journal of the Indian Medical Association. 2004 Mar;102(3):138-9.
14. Singh KG, Singh SD, Bijoychandra K, Kamei P, Chingkhei BM. A study on the clinical profile of stroke in relation to glycaemic status of patients. J Indian Academy Clin Med. 2014;15(3):177-81.
15. Prasad BNR, Reddy AS, Prabhakar K, Thejdeep R, Teja NS, Reddy K, Maveesh. Stress Hyperglycemia as a Prognostic Marker in Acute Ischaemic Stroke. Ejpmr. 2016;3(3): 247-256.
16. Kiers L, Davis SM, Larkins R et al. Stroke topography and outcome in relation to hyperlycaemia and diabetes. Journal Neurology,Neurosurgery, Psychiatry 1992; 55 (4): 263-70.
17. Al-Weshahy A, El-Sherif R, Selim KA, Heikal A. Short term outcome of patients with hyperglycemia and acute stroke. The Egyptian Journal of Critical Care Medicine. 2017 Dec 1;5(3):93-8.
18. Jorgensen H, Nakayama H, Raaschou HO, et al. Stroke in patients with diabetes.The Copenhagen Stroke Study. Stroke 1994;25:1977–84.
19. Adams Jr, Harold P., Gregory Del Zoppo, Mark J. Alberts, Deepak L. Bhatt, Lawrence Brass, Anthony Furlan, Robert L. Grubb et al. "Guidelines for the early management of adults with ischemic stroke: a guideline from the American Heart Association/American Stroke Association Stroke Council, Clinical Cardiology Council, Cardiovascular Radiology and Intervention Council, and the Atherosclerotic Peripheral Vascular Disease and Quality of Care Outcomes in Research Interdisciplinary Working Groups: the American Academy of Neurology affirms the value of this guideline as an educational tool for neurologists." Circulation 115, no. 20 (2007): e478-e534.
20. Gajurel BP, Dhungana K, Parajuli P, Karn R, Rajbhandari R, Kafle D, Oli KK. The National Institute of Health Stroke Scale Score and Outcome in acute Ischemic Stroke. Journal of Institute of Medicine. 2015 Feb 6;38(1).
21. Lindsberg PJ, Roine RO. Hyperglycemia in acute stroke. Stroke. 2004 Feb 1;35(2):363-4.
22. Christensen H, Boysen G. Blood glucose increases early after stroke onset: a study on serial measurements of blood glucose in acute stroke. European Journal of neurology. 2002 May;9(3):297-301.
23. Umpierrez GE, Isaacs SD, Bazargan N, You X, Thaler LM, Kitabchi AE. Hyperglycemia: an independent marker of in-hospital mortality in patients with undiagnosed diabetes. The Journal of Clinical Endocrinology & Metabolism. 2002 Mar 1;87(3):978-82.
24. Vinychuk SM, Melnyk VS, Margitich VM. Hyperglycemia after acute ischemic stroke: prediction, significance and immediate control with insulin-potassium- saline-magnesium infusions. Heart Drug. 2005;5(4):197-204.