International Journal of Medicine
pISSN 1468-3814 | eISSN 2667-7008
https://theinternationalmedicine.com/

Original Researcher Article *DOI: 10.61336/im/26-2-12*

Clinico-Radiological Profile and Risk Factor Analysis of Acute Ischemic Stroke in a Tertiary Care Center.

Dr. Chaithra H.[1], Dr. Nishchit K.N.*[2], Dr. Ramya D.N.[3]

[1]*Assistant professor, Department of General Medicine, Farookh Academy of Medical Education Hospital & Research Institute, Mysuru, Karnataka, India.*

[2]*Assistant Professor, Department of General Medicine, Farookh Academy of Medical Education Hospital & Research Institute, Mysuru, Karnataka, India.*

[3]*Assistant Professor, Department of General Medicine, Farookh Academy of Medical Education Hospital & Research Institute, Mysuru, Karnataka, India.*

Correspondence:
Dr. Nishchit K.N.
Assistant Professor, Department of General Medicine, Farookh Academy of Medical Education Hospital & Research Institute, Mysuru, Karnataka, India.

Received: 12-02-2026
Revised: 18-03-2026
Accepted: 16-04-2026
Published: 23-04-2026

Abstract

Background: Acute ischemic stroke is a leading cause of morbidity and mortality worldwide, particularly in developing countries. It accounts for the majority of cerebrovascular accidents and is strongly associated with modifiable risk factors such as hypertension, dyslipidemia, and cardiovascular diseases. Early identification of clinical presentation, radiological patterns, and associated risk factors is crucial for timely diagnosis, management, and prevention of complications. ***Methods:*** This hospital-based cross-sectional study was conducted in a tertiary care center and included 50 patients aged above 40 years diagnosed with acute ischemic stroke. Detailed clinical history, including risk factors such as hypertension and its duration, was recorded. All patients underwent neurological examination and radiological evaluation using CT scan and MRI brain when indicated. Additional investigations included lipid profile, echocardiography, and routine laboratory tests. Data were analyzed to assess clinical presentation, radiological distribution of infarcts, and associated risk factors. ***Results:*** The mean age of patients was 65.88 ± 10.96 years, with a male predominance (54%). The majority of patients belonged to the 60–79 years age group. Hemiplegia/hemiparesis was the most common clinical presentation (66%), followed by combined motor, sensory, and speech deficits (20%). Radiologically, the internal capsule was the most frequently involved site (66%), followed by basal ganglia (16%) and thalamus (10%). Hypertension was the most significant risk factor, with a majority presenting with Stage 2 hypertension (58%). Longer duration of hypertension (>5 years) was observed in most patients. Dyslipidemia was present in 76% of cases. Echocardiographic abnormalities such as left ventricular hypertrophy and atrial fibrillation were also noted. ***Conclusion:*** Acute ischemic stroke commonly affects the elderly population and is strongly associated with modifiable risk factors, particularly hypertension and dyslipidemia. The severity of stroke correlates with elevated blood pressure at presentation and a longer duration of hypertension. Early diagnosis, risk factor modification, and appropriate management strategies are essential to reduce morbidity and mortality.

Keywords: Acute Ischemic Stroke, Hypertension; Clinico-Radiological Profile, Risk Factors, Dyslipidemia, CT Scan, MRI.

INTRODUCTION

Stroke is one of the leading causes of morbidity and mortality worldwide and represents a major public health burden, particularly in low- and middle-income countries.[1] It is defined as the sudden onset of focal neurological deficit attributable to a vascular cause lasting more than 24 hours or leading to death.[2] Among all stroke types, acute ischemic stroke accounts for nearly 80–85% of cases, resulting from an interruption of cerebral blood flow due to thrombosis or embolism.[3]

The global incidence of stroke has been increasing, with an estimated 12 million new cases reported annually, contributing significantly to long-term disability and healthcare costs.[4] In India, the burden of stroke is rising due to demographic transition, increasing life expectancy, and a higher prevalence of vascular risk factors.[5] Early identification of clinical patterns and radiological features is essential for prompt diagnosis and effective management.

Neuroimaging plays a pivotal role in the evaluation of acute ischemic stroke. CT (Computed Tomography) remains the first-line imaging modality due to its availability and rapid acquisition, primarily used to exclude haemorrhage.[6] MRI

(Magnetic Resonance Imaging), especially DWI (Diffusion-Weighted Imaging), is more sensitive in detecting early ischemic changes and helps in identifying the ischemic penumbra, which is crucial for therapeutic decisions.[7]
Several modifiable and non-modifiable risk factors contribute to the development of ischemic stroke. Hypertension is the most significant modifiable risk factor, accounting for a large proportion of stroke cases.[8] Other important risk factors include diabetes mellitus, dyslipidemia, smoking, atrial fibrillation, and coronary artery disease.[9] Studies have shown that nearly 90% of stroke risk is attributable to these modifiable factors.[4]

Clinico-radiological correlation is important in understanding the pattern, location, and severity of infarction, which in turn influences prognosis and management strategies.[10] Common sites of infarction include the internal capsule, basal ganglia, and cortical regions supplied by major cerebral arteries.[11] The clinical presentation varies depending on the vascular territory involved, with hemiplegia, speech disturbances, and sensory deficits being the most frequent manifestations.[12]

AIMS AND OBJECTIVES

The aim of this study was to evaluate the clinico-radiological profile and analyze the risk factors associated with acute ischemic stroke in a tertiary care center. It sought to assess the demographic characteristics of affected patients, along with their clinical presentation and neurological deficits at the time of admission. The study also aimed to evaluate radiological findings, including the site and extent of infarction using CT and MRI. In addition, major risk factors such as hypertension, dyslipidemia, and cardiac abnormalities were identified, with particular emphasis on determining the association of hypertension-its duration and blood pressure levels at presentation-with the occurrence and severity of acute ischemic stroke.

MATERIALS AND METHODS

Study Design

This was a hospital-based cross-sectional study conducted in the Department of Medicine at Adichunchanagiri Hospital and Research Centre, BG Nagara (571448), over a period from October 2018 to June 2020. The study included 50 patients diagnosed with acute ischemic stroke who were admitted to the tertiary care center during the study period.

Inclusion and Exclusion Criteria

Patients aged more than 40 years who were admitted with a clinical diagnosis of acute ischemic stroke and had radiological confirmation on CT scan and/or MRI were included. Both male and female patients with first-ever or recurrent ischemic stroke were considered, irrespective of associated risk factors. Patients with haemorrhagic stroke, traumatic brain injury, stroke mimics, incomplete clinical or radiological data, or those unwilling to participate were excluded.

Sample Size

A convenience sample of 50 patients meeting the inclusion criteria was enrolled consecutively during the study period from October 2018 to June 2020. The study was conducted after obtaining approval from the Institutional Ethics Committee of Adichunchanagiri Hospital and Research Centre. Informed verbal consent was obtained from all patients or their relatives prior to enrolment.

Data Collection Procedure

Detailed clinical history was collected using a predesigned structured proforma. Information regarding demographic details, presenting complaints, history of transient ischemic attack, hypertension (including duration), diabetes mellitus, dyslipidemia, and cardiac conditions was recorded. A comprehensive general, cardiovascular, and neurological examination was performed. Blood pressure was recorded at admission. All patients underwent CT scan of the brain; MRI was performed when indicated. Laboratory investigations included complete hemogram, renal function tests, lipid profile, urinalysis, ECG, and echocardiography.

Statistical Analysis

Descriptive statistics, including mean, standard deviation, frequencies, and percentages, were used to summarize variables. Associations between risk factors and clinical or radiological parameters were analyzed using the Chi-square test for categorical variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1: Age Distribution of Study Population

Age Group (years)	Number of Patients	Percentage
40–49	2	4%
50–59	11	22%
60–69	16	32%
70–79	16	32%
80–89	4	8%

Table 1 illustrates that the majority of patients belonged to the 60–79 years age group (64%), indicating a higher prevalence of stroke among the elderly population. The mean age was 65.88 ± 10.96 years.

Table 2: Gender Distribution

Gender	Number of Patients	Percentage
Male	27	54%
Female	23	46%

Table 2 shows a slight male predominance (54%) in acute ischemic stroke cases, consistent with published literature.

Table 3: Clinical Features at Presentation

Clinical Feature	Number	Percentage
Hemiplegia/Hemiparesis	32	64%
Motor + Sensory + Speech Deficits	11	22%
Speech Disturbance	4	8%
Disturbed Consciousness	2	4%
Seizures	1	2%

Table 3 demonstrates that hemiplegia/hemiparesis was the most common clinical presentation (64%), followed by combined neurological deficits indicating severe stroke (22%).

Table 4: Echocardiographic Findings

Finding	Number of Patients	Percentage
Normal	16	32%
Concentric LVH	15	30%
Left Ventricular Diastolic Dysfunction	7	14%
Ischemic Heart Disease	5	10%
Atrial Fibrillation	5	10%
Left Atrial Thrombus	2	4%

Table 4 shows that LVH (Left Ventricular Hypertrophy) was the most common cardiac abnormality (30%), followed by diastolic dysfunction (14%) and atrial fibrillation (10%).

Table 5: Lipid Profile Status

Lipid Profile	Number of Patients	Percentage
Normal	12	24%
Dyslipidemia	38	76%

Table 5 highlights that a large majority of patients (76%) had dyslipidemia, indicating its strong association with ischemic stroke.

Table 6: Radiological Distribution of Infarct (CT/MRI Brain)

Site of Infarct	Imaging Modality	Number	Percentage
Internal Capsule	CT Brain	33	66%
Basal Ganglia	CT Brain	8	16%
Thalamus	CT Brain	5	10%
Cerebellum	CT + MRI Brain	3	6%
Brainstem	CT + MRI Brain	1	2%

Table 6 demonstrates that the internal capsule was the most common site of infarction (66%), followed by basal ganglia (16%) and thalamus (10%), indicating a predominance of deep brain infarcts. Posterior fossa lesions (cerebellum and brainstem) were detected only on MRI.

Table 7: Distribution of Major Risk Factors among Study Population

Risk Factor	Number of Patients	Percentage
Hypertension	50	100%
Dyslipidemia	38	76%
Cardiac Abnormalities*	34	68%

Cardiac abnormalities include left ventricular hypertrophy, diastolic dysfunction, ischemic heart disease, atrial fibrillation, and left atrial thrombus. Table 7 illustrates the distribution of major risk factors among the study population. Hypertension was present in all patients (100%), as it formed the primary inclusion criterion. Dyslipidemia was observed in 76% of patients, indicating a strong association with ischemic stroke. Cardiac abnormalities were present in 68% of cases, highlighting the significant contribution of cardiovascular conditions in the pathogenesis of stroke. These findings emphasize the role of multiple modifiable risk factors in the development of acute ischemic stroke.

DISCUSSION

Acute ischemic stroke remains a major cause of morbidity and mortality worldwide, particularly affecting the elderly population. In the present study, the majority of patients belonged to the 60–79 years age group with a mean age of 65.88 ± 10.96 years. This finding is comparable to studies by Dewan KR et al.[13] (67.15 ± 12.58 years) and Naik M et al.[10] (67.04 ± 13.39 years), highlighting that stroke predominantly affects the elderly due to progressive atherosclerosis and accumulation of vascular risk factors.[3]

In the present study, there was a slight male predominance (54%), consistent with findings from Soliman RH et al.[14] who reported 53.9% male patients. This may be attributed to higher exposure to risk factors such as hypertension, smoking, and occupational stress among males.[15]

Clinically, hemiplegia/hemiparesis was the most common presentation (64%), followed by combined motor, sensory, and speech deficits (22%). These findings are comparable to the study by Kaur G et al.[12] where hemiplegia was observed in 69% of patients. This consistency reflects common involvement of motor pathways in ischemic stroke, particularly the corticospinal tract passing through the internal capsule.[16]

Cardiac abnormalities were frequently observed, with left ventricular hypertrophy (30%) being the most common finding. This is comparable to Amin H et al.[17] who reported LVH in 25% of stroke patients. Atrial fibrillation was present in 10% of cases, aligning with findings from Marini C et al.[18] emphasizing the role of cardioembolic mechanisms in ischemic stroke.

Dyslipidemia was observed in 76% of patients, consistent with Zhao P et al.[19] who reported approximately 70% dyslipidemia in stroke patients. Elevated cholesterol and LDL levels contribute to atherosclerotic plaque formation, thereby increasing the risk of cerebral infarction.[20]

Radiologically, the internal capsule was the most commonly involved site (66%), followed by basal ganglia (16%) and thalamus (10%). These findings are in agreement with Naik M et al.,[10] where deep brain structures were commonly affected. This distribution reflects the vulnerability of small penetrating arteries to occlusion, especially in hypertensive patients.[11]

The findings of this study emphasize that acute ischemic stroke is strongly associated with modifiable risk factors such as hypertension, dyslipidemia, and cardiac abnormalities. The clinico-radiological correlation observed is consistent with existing literature and highlights the importance of early identification and management of these risk factors to reduce the burden of stroke.

CONCLUSION

Acute ischemic stroke predominantly affects the elderly population and commonly presents with motor deficits such as hemiplegia. Radiologically, deep brain structures like the internal capsule and basal ganglia are most frequently involved. Hypertension, dyslipidemia, and cardiac abnormalities are the major associated risk factors. Early identification and effective management of these modifiable risk factors are essential to reduce the burden and adverse outcomes of stroke.

REFERENCES

1. Feigin VL, Stark BA, Johnson CO, et al. Global, regional, and national burden of stroke and its risk factors, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet Neurol 2021;20(10):795-820.
2. World Health Organization (WHO). Stroke/Cerebrovascular accident. Available from: https://www.who.int

3. Harrison TR. Principles of Internal Medicine. 20th edn. New York: McGraw-Hill 2018:3068-3079.
4. O'Donnell MJ, Chin SL, Rangarajan S, et al. Global and regional effects of potentially modifiable risk factors associated with acute stroke in 32 countries (INTERSTROKE): a case-control study. Lancet 2016;388(10046):761-75.
5. Pandian JD, Sudhan P. Stroke epidemiology and stroke care services in India. J Stroke 2013;15(3):128.
6. Wardlaw JM, Seymour J, Cairns J, et al. Immediate computed tomography scanning of acute stroke is cost-effective and improves quality of life. Stroke 2004;35(11):2477-83.
7. Warach S, Gaa J, Siewert B, et al. Acute human stroke studied by whole brain echo planar diffusion-weighted magnetic resonance imaging. Ann Neurol 1995;37(2):231-41.
8. Goldstein LB, Adams R, Becker K, et al. Primary prevention of ischemic stroke: a statement for healthcare professionals from the Stroke Council of the American Heart Association. Stroke 2001;32(1):280-99.
9. Sacco RL, Benjamin EJ, Broderick JP, et al. Risk factors. Stroke 1997;28(7):1507-17.
10. Naik M, Rauniyar RK, Sharma UK, et al. Clinico-radiological profile of stroke in eastern Nepal: a computed tomographic study. Kathmandu Univ Med J 2006;4(2):161-6.
11. Patel V, Vagadiya A. Study of clinico-radiological profile of ischemic cerebrovascular stroke and its outcome at tertiary care centre. Acad J Med 2019;2(2):159-62.
12. Kaur G, Samar N, Sharma J, et al. A study of clinico-radiological and socio-demographic profile of patients with stroke in a tertiary care hospital of South West Rajasthan. J Assoc Physicians India 2020;68(3):54-8.
13. Dewan KR, Rana PV. A study of seven day mortality in acute ischemic stroke in a teaching hospital in Chitwan. J Nepal Health Res Counc 2014;12(26):33-8.
14. Soliman RH, Oraby MI, Fathy M, et al. Risk factors of acute ischemic stroke in patients presented to Beni-Suef University Hospital. Egypt J Neurol Psychiatr Neurosurg 2018;54(1):8.
15. Sacco RL. Risk factors, outcomes, and stroke subtypes for ischemic stroke. Neurology 1997;49(5 Suppl 4):S39-44.
16. Hauser SL, Josephson SA. Harrison's neurology in clinical medicine. 3rd edn. New York: McGraw-Hill 2013.
17. Amin H, Aronow WS, Lleva P, et al. Prevalence of transthoracic echocardiographic abnormalities in patients with ischemic stroke, intracerebral hemorrhage, and subarachnoid hemorrhage. Arch Med Sci 2010;6(1):40-2.
18. Marini C, De Santis F, Sacco S, et al. Contribution of atrial fibrillation to incidence and outcome of ischemic stroke: results from a population-based study. Stroke 2005;36(6):1115-9.
19. Zhao P, Liu S, Zhong Z, et al. Age- and sex-related difference of lipid profile in patients with ischemic stroke in China. Medicine (Baltimore) 2018;97(23):e10930.
20. Atkins D, Psaty BM, Koepsell TD, et al. Cholesterol reduction and the risk for stroke in men: a meta-analysis of randomized, controlled trials. Ann Intern Med 1993;119(2):136-45.