

## Original Research

# Evaluation of Clinico-Radiological Profile of Subjects Having Ischemic Stroke: An Observational Study

P. Krishna Reddy<sup>1</sup>, Swarupa Rani G<sup>2</sup>, K. Srinivas<sup>3</sup>, Dhanaraju K M<sup>4</sup>

<sup>1</sup>Associate Professor, Department of Radiodiagnosis, Ayaan Institute of Medical Sciences, Teaching Hospital and Research Centre, Moinabad, Ranga Reddy, Telangana, India.

<sup>2</sup>Associate Professor, Department of Radiodiagnosis, N. K. P. Salve Institute of Medical Sciences & Research Centre, Nagpur, Maharashtra, India.

<sup>3</sup>Associate Professor, Department of General Medicine, Dr. Patnam Mahender Reddy Institute of Medical Sciences, Chevella, Ranga Reddy, Telangana, India.

<sup>4</sup>Associate Professor, Department of General Medicine, N. K. P. Salve Institute of Medical Sciences & Research Centre, Nagpur, Maharashtra, India.

### Corresponding Author:

Dr. Dhanaraju K M

Associate Professor, Department of General Medicine, N. K. P. Salve Institute of Medical Sciences & Research Centre, Nagpur, Maharashtra, India.

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### Abstract

**Background:** Stroke is one of the leading causes of death, long-term disability, and hospital admission in the industrialized world. This study was conducted to evaluate the clinico-radiological profile of subjects having ischemic stroke

**Materials and Methods:** This study presents a retrospective analysis of 100 cases of ischemic stroke. Participants were required to be over 18 years of age, and their symptoms and clinical signs had to align with the WHO's definition of stroke, confirmed by CT imaging indicating ischemic infarction. Statistical evaluations were performed using SPSS software.

**Results:** This study involved 100 subjects (53 males, 47 females) with a majority aged 61-70 years (48%). Stroke characteristics included: right (36%) and left (52%) hemiplegia, with hypertension (26%) and diabetes mellitus (25%) being the primary risk factors. Cerebral infarction commonly occurred in the parietal (55%) and frontal (21%) regions.

**Conclusion:** The occurrence of ischemic stroke was higher among individuals aged 61 to 70 years, exhibiting a greater prevalence in males. Hypertension emerged as the predominant risk factor.

**Keywords:** Ischemia, Infarction, Stroke, Hemiplegia, Hypertension.

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## INTRODUCTION

Stroke is one of the leading causes of death, long-term disability, and hospital admission in the industrialized world.<sup>1</sup> The loss of the affected individuals from work force and the extended hospitalisation they require during recovery make the economic impact of the disease among the most devastating. In Sweden, the prevalence of home-bound stroke victims with residual dysfunctions after an average 95.2 days' hospitalisation has been estimated at 0.74 per 1000.<sup>2</sup> Studies in USA suggest an annual cost of at least \$ 30-40 billion.<sup>3,4</sup> The frequency of different types of stroke, their risk factors and incidence rates vary in different regions of the world.<sup>5,6</sup> There are several reports on the pattern and risk factors of stroke in the middle and eastern provinces of Saudi Arabia.<sup>7</sup> In-hospital stroke is defined as acute infarction of central nervous system tissue that occurs during

hospitalization in a patient originally admitted for another diagnosis or procedure. Between 2% and 17% of all patients with stroke in published series had onset of symptoms during hospitalization.<sup>8-10</sup> In-hospital strokes complicate between 0.04% and 0.06% of all admissions.<sup>11,12</sup> The proportion of reported in-hospital events tends to be lower in large stroke registries than in single hospital studies. In-hospital transient ischemic attacks (TIA) and subtle infarctions may be unrecognized, or underreported, in complicated ill inpatients.<sup>10</sup> Hence; the present study was conducted to evaluate the clinico-radiological profile of subjects having ischemic stroke.

## MATERIALS AND METHODS

The present study was conducted to evaluate the clinico-radiological profile of subjects having ischemic stroke. This study presents a retrospective

analysis of 100 cases of ischemic stroke. The world health organization (WHO) defines stroke as the rapid onset of clinical signs indicating focal or global disturbances in cerebral function, with symptoms persisting for 24 hours or longer, or resulting in death, and with no identifiable cause other than a vascular origin (who 1989). This definition was utilized to select cases for inclusion in the study. Participants were required to be over 18 years of age, and their symptoms and clinical signs had to align with the who's definition of stroke, confirmed by CT imaging indicating ischemic infarction. Individuals under 18 years of age, as well as those diagnosed with hemorrhagic stroke or hemorrhagic infarction, were excluded from the analysis. Statistical evaluations were performed using SPSS software.

## RESULTS

In this study, there were 100 subjects. Most number of subjects belonged to the age group of 61-70 years (48%), followed by 51-60 years (23%). 7 subjects belonged to the age group of 20-40 years, 12 subjects

belonged to the age group of 41-50 years and 10 subjects belonged to the age group of 71-80 years. Out of 100 participants, there were 53 male and 47 female. Right stroke with left hemiplegia was seen in 36 subjects and left stroke with right hemiplegia was seen in 52 subjects. Hemiplegia was the most common clinical feature seen in 56 subjects, followed by speech disturbances seen in 19 cases. Convulsions was seen in 10 patients. Headache and vomiting were evident in 1 patient, each. Instability of gait and altered sensorium was observed in 4 and 9 subjects, respectively. Smoking was a risk factor for ischemic stroke in 19 cases. Dyslipidemia and alcohol were the risk factors in 23 and 7 cases, respectively. The most common risk factor for ischemic stroke was hypertension seen in 26 subjects followed by diabetes mellitus evident in 25 cases. Cerebral infarction was seen in parietal area in 55 cases, in frontal region in 21 cases, in temporal region in 19 cases, in occipital region in 3 cases and in medulla oblongata and pons in 1 case, each.

**Table 1: Age-Wise Distribution of Subjects.**

Age Group (Years)	Number of Cases	Percentage
20-40	07	07
41-50	12	12
51-60	23	23
61-70	48	48
71-80	10	10

**Table 2: Gender-Wise Distribution of Subjects**

Gender	Number of Subjects	Percentage
Male	53	53
Female	47	47
Total	100	100

**Table 3: Clinical Characteristics of The Patients**

Ischemic Stroke	Number of Cases	Percentage
<b>Neurological Findings</b>		
Right Stroke + Left Hemiplegia	36	36
Left Stroke + Right Hemiplegia	52	52
<b>Clinical Features</b>		
Hemiplegia	56	56
Speech Involvement	19	19
Convulsions	10	10
Vomiting	01	01
Headache	01	01
Instability Of Gait	04	04
Altered Sensorium	09	09
<b>Risk Factors</b>		
Smoking	19	19
Dyslipidemia	23	23
Alcohol	07	07
Hypertension	26	26
Diabetes Mellitus	25	25

**Table 4: Topographic Distribution of Cerebral Infarction**

Affected Areas of Brain On CT Scan Brain	Frequency of Cerebral Infarction	Percentage
Parietal	55	
Frontal	21	
Temporal	19	
Occipital	03	
Medulla Oblongata	01	
Pons	01	

**DISCUSSION**

Ischemic strokes are the most common ( $\approx 85\%$ ), the rest being hemorrhagic that include cerebral and subarachnoid ( $\approx 15\%$ ).<sup>13</sup> The trial of org10172 (toast) is the most commonly used classification that identifies five subtypes in acute ischemic stroke: 1) large artery atherosclerosis 2) cardio-embolism 3) small vessel occlusion 4) stroke of other determined etiology 5) stroke of undetermined etiology.<sup>14</sup> The events resulting from any subtype of ischemic stroke result in the loss of blood supply, oxygen, nutrients and elimination of metabolic wastes. These resulting changes obstruct normal neuronal functioning.<sup>15</sup> This ultimately results in neuronal death/necrosis from occlusion of the vessel. The brain tissue is exquisitely sensitive to these changes, and the therapeutic window that is needed to prevent reversible ischemia from becoming irreversible infarction<sup>16</sup> is narrow and stresses the phrase “time is brain”. This concept is especially important to minimizing evolving insult and controlling the propagation of ischemic penumbra.<sup>17-19</sup> Furthermore from a therapeutic point of view, this crucial time provides a “window of opportunity” in reversing the neurological symptoms either partly or completely through acute interventional approaches, either invasively or non-invasive.<sup>20, 21</sup> Hence; this study was conducted to evaluate the clinico-radiological profile of subjects having ischemic stroke.

In this study, there were 100 subjects. Most number of subjects belonged to the age group of 61-70 years (48%), followed by 51-60 years (23%). 7 subjects belonged to the age group of 20-40 years, 12 subjects belonged to the age group of 41-50 years and 10 subjects belonged to the age group of 71-80 years. Out of 100 participants, there were 53 male and 47 female. Right stroke with left hemiplegia was seen in 36 subject and left stroke with right hemiplegia was seen in 52 subjects. Hemiplegia was the most common clinical feature seen in 56 subjects, followed by speech disturbances seen in 19 cases. Convulsions was seen in 10 patients. Headache and vomiting were evident in 1 patient, each. Instability of gait and altered sensorium was observed in 4 and 9 subjects, respectively. Smoking was a risk factor for ischemic stroke in 19 cases. Dyslipidemia and alcohol were the risk factors in 23 and 7 cases, respectively. The most common risk factor for ischemic stroke was hypertension seen in 26 subjects followed by diabetes mellitus evident in 25 cases. Cerebral infarction was seen in parietal area in 55 cases, in frontal region in

21 cases, in temporal region in 19 cases, in occipital region in 3 cases and in medulla oblongata and pons in 1 case, each. Akbar dh et al<sup>21</sup> determined the pattern and risk factors of stroke. Demographic data of the patients, stroke types, risk factors and mortality were reported. Of the 103 patients studied, 56% were saudis and 44 % non-saudis with male predominance and mean ages of 66 and 62 years respectively. In saudis, the stroke types were 74% ischemic, 10% hemorrhagic and 16% unspecified, whereas in non-saudis, the figures were respectively 62%, 29% and 9%. The frequency of stroke increased steadily with age in saudis but dropped after the sixth decade in non-saudis. There was no significant difference between the saudis and the non-saudis in the occurrence of risk factors for stroke or in mortality. The pattern and risk factors of cases of stroke treated at Kauh are similar to those reported from other regions of Saudi Arabia and other parts of the world. Vaidya CV et al<sup>22</sup> identified the risk factors, assess various clinical and radiological features with patients. The mean age was 60.20 years. Majority (32%) were in age group of 61–70 years young ischemic stroke (age  $\leq 45$  years) comprised of 17.14% of all patients. The male to female ratio was 1.6:1 with male predominance. Most of the patients (50.3%) were having right hemiplegia followed by left hemiplegia (40%). The common clinical presentation was hemiplegia (49.1%) followed by speech involvement (29.1%), altered sensorium (9.4%). Most common risk factor was hypertension (30.1%) followed by previous history of stroke (16.1%), dyslipidemia (15.6%), and smoking (15.1%). The frequent site of the infraction was parietal (33.3%) followed by frontal (16.2%) and basal ganglia (10.7%). Incidence of ischemic stroke was more in the age group of 61–70 years with male predominance and hypertension was the most common risk with affection of middle cerebral artery territory. SylajaPN et al<sup>23</sup> evaluated 2066 ischemic stroke patients admitted  $< 2$  weeks after onset. The mean age was  $58.3 \pm 14.7$  years, 67.2% male. The median admission national institutes of health stroke scale (NIHSS) score were 10 (iqr 5–15) and 24.5% had NIHSS  $\geq 16$ . Hypertension (60.8%), diabetes (35.7%) and tobacco use (32.2%, including beedi/smokeless tobacco) were common risk factors. Only 4% had atrial fibrillation. All patients underwent CT or MRI; 81% had cerebrovascular imaging. Stroke etiological subtypes were large-artery (29.9%), cardiac (24.9%), small-artery (14.2%), other definite (3.4%) and

undetermined (27.6%, including 6.7% with incomplete evaluation). Intravenous or intra-arterial thrombolysis was administered in 13%. In-hospital mortality was 7.9% and 48% achieved modified ranking scale score 0–2 at 90-days. On multivariate analysis, diabetes predicted poor 3-month outcome and younger age, lower admission NIHSS and small-artery etiology predicted excellent 3-month outcome. These comprehensive and novel clinical-imaging data will prove useful in refining stroke guidelines and advancing stroke care in India.

## CONCLUSION

The occurrence of ischemic stroke was higher among individuals aged 61 to 70 years, exhibiting a greater prevalence in males. Hypertension emerged as the predominant risk factor.

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