

**A Study of Clinical Profile of Cerebrovascular Accident in Adults and Geriatric Population with Special Reference To ECG Changes At A Tertiary Care Centre**

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**Abstract**

**Background:** Stroke is a leading cause of death and disability worldwide, with increasing prevalence and diverse clinical manifestations. This study aimed to evaluate the prevalence, risk factors, clinical features, outcomes, and electrocardiographic (ECG) changes associated with cerebrovascular accidents (CVA) in different age groups at a tertiary care centre.

**Methods:** A cross-sectional study was conducted on 100 patients diagnosed with acute CVA, confirmed by brain imaging. Data were collected on patient demographics, risk factors, stroke types, clinical presentation, and ECG findings. Patients with brain tumors, head trauma, or other mimicking neurological conditions were excluded.

**Results:** The mean age of patients was 58.4 years, with a male predominance (70%). Hypertension (70%) was the

most common risk factor, followed by diabetes (40%), smoking (30%), and dyslipidemia (20%). Ischemic stroke was the most prevalent type (60%), followed by hemorrhagic stroke (25%), subarachnoid hemorrhage (10%), and cerebral venous thrombosis (5%). Hemiparesis (80%) was the most frequent presentation. ECG changes were noted in 80% of patients, with T wave inversion (40%) being most common. Abnormal ECG findings were more prevalent and severe in hemorrhagic and subarachnoid strokes, and associated with higher mortality (20%) compared to those with normal ECGs (5%).

**Conclusion:** CVA is associated with significant neurological and cardiac manifestations. ECG abnormalities, particularly in hemorrhagic and right-

sided strokes, may have prognostic value and warrant routine cardiac evaluation in all stroke patients.

**Keywords:** cerebrovascular accident, CVA, hemorrhage

### **Introduction**

Stroke is the second leading cause of death and a major cause of disability. Defined as an episode of acute neurological dysfunction presumed to be caused by ischemia haemorrhage, persisting  $\geq 24$  h or until death. It is a complicated illness characterized by various symptoms, including sensory, cognitive, perceptual, or behavioural, and motor deficits. The prevalence of stroke has increased by 50 percent over the last 17 years, and at present, 1 in 4 people are at risk of getting a stroke in their lifetime, The chance of stroke occurring at age 55 and above is 1 in 5 for women and 1 in 6 for men, The current prevalence rate in India varies from 44.54 to 150/1000004. Stroke affects acute neurological dysfunction, such as motor and cognitive damage, and hampers a patient's day-to-day life by leading to disability. . Stroke, or cerebrovascular accidents, are a major cause of death and long-term disability and are considered a global health crisis. The term "stroke" was probably first used in medicine by William Cole in a Physico-Medical Essay Concerning the Late Frequencies of Apoplexies, published in 1689. A brief period of neurological impairment brought on by focal brain and spinal cord or retinal ischemia that does not involve an abrupt infarction is known as a transient ischemic attack. Hemorrhagic stroke and ischemic stroke are the two forms of cerebrovascular accidents (stroke). Increased age, a history of stroke or transient ischemic attack, high blood pressure, smoking, diabetes, high cholesterol, and atrial fibrillation/flutter<sup>8</sup> are all linked to an increased risk of stroke. Since blood glucose abnormalities and changed lipid profiles are frequently linked to stroke,

they should be taken into account for improved secondary prevention.

Research indicates that since 95% of stroke cases happen in people 45 years of age or older, age is the most important risk factor for stroke that cannot be changed. Two-thirds of these incidents happen in people 65 and older. High blood pressure and thyroid conditions are two more significant risk factors for stroke. 11. In addition to these, established risk factors include high body mass index, diabetes mellitus, hypertension, and being overweight or obese<sup>12</sup>. According to a study, smoking, alcohol use, diabetes, heart disease of any kind, and irregular electrocardiograms (ECGs) are risk factors.

### **Methodology**

The study was carried out at a tertiary care centre, This is a medical facility for patients with severe, conditions. The study included a total of 100 patients with acute CVA.

The four types of CVA are:

An ischemic stroke occurs when a blood artery supplying blood to the brain is blocked.

Hemorrhagic stroke, defined as rupture of a blood vessel that causes bleeding in the brain.

Subarachnoid hemorrhage, which is a type of hemorrhagic stroke that occurs in the space between the brain and the skull.

Cerebral venous thrombosis, which is a rare type of stroke that occurs when a blood clot forms in the veins that drain blood from the brain. The researchers gathered data on the patients' symptoms, medical history, and prognosis by documenting their clinical characteristics, risk factors, and outcomes.

The ECG changes were analyzed and correlated with the type and location of CVA, e.

The purpose of the study was to evaluate the prevalence, risk factors, types, outcomes, and management of CVA

in different age groups, and to assess the role of ECG in the diagnosis, prognosis, and treatment of CVA and its cardiac complications.

**Inclusion criteria**

- Patients admitted to the medical ward within 24 hours of admission due to an acute neurological impairment.
- Patients who are at least eighteen years old.
- Patients whose brain MRI or CT scan validated their diagnosis of CVA

**Exclusion criteria**

Patient with history of brain tumors, head injuries, or other neurological conditions that could mimic cerebrovascular accidents.

**Results**

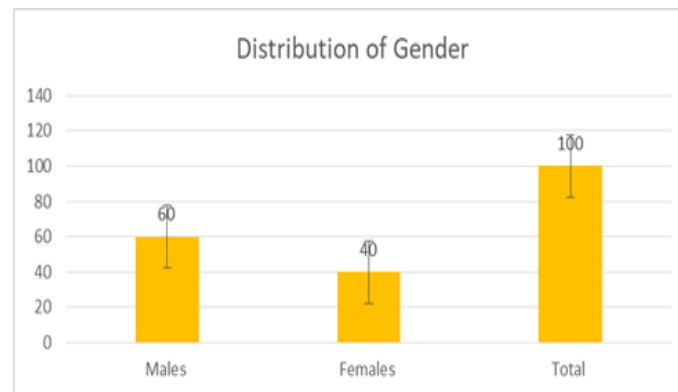
The patients' mean age was 58.4 years, and 60% of them were men. The most frequent risk factor was hypertension (70%), which was followed by diabetes mellitus (40%), smoking (30%), and dyslipidemia (20%). Ischemic stroke accounted for 60% of CVAs, with hemorrhagic stroke coming in second at 25%, subarachnoid hemorrhage at 10%, and cerebral venous thrombosis at 5%. Hemiparesis accounted for 80% of the most common clinical presentation, followed by altered sensoryium (40%), aphasia (30%), and cranial nerve palsies (20%). T wave inversion was the most common (40%) of the changes seen in 78% of the patients, followed by st segment depression (30%), Qtc prolongation (20%), and arrhythmias (10%). Compared to ischemic stroke and cerebral venous thrombosis, hemorrhagic stroke and subarachnoid hemorrhage had more frequent and severe ECG changes. The location of the CVA also affected the changes in the ECG; lesions on the right side caused more changes than lesions on the left.

Mean age of the patients was 58.4 years

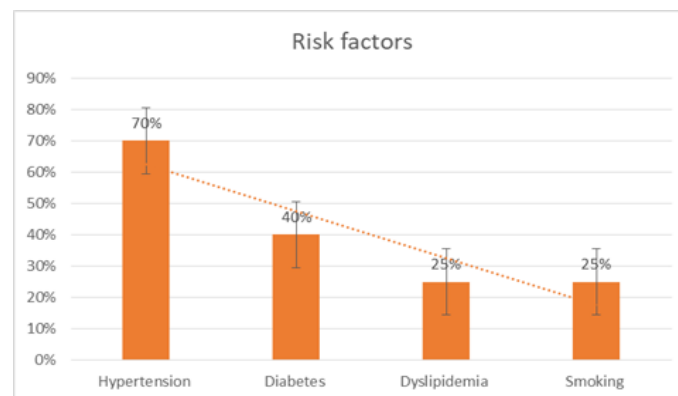
**Sex**

Majority of our patients was male 70% and Female 30

Graph 1: Distribution of Gender

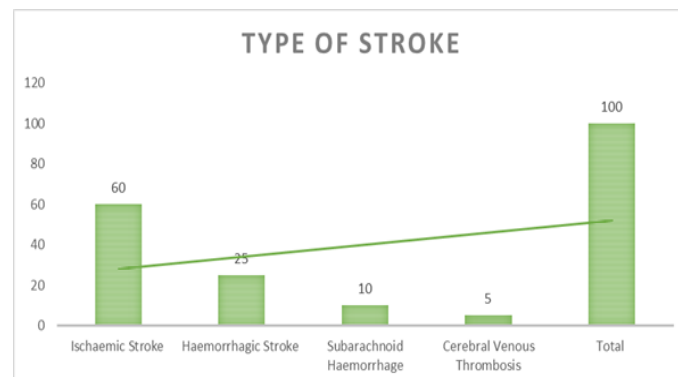


Graph 2: Risk Factors



Hypertension is The Most Common Risk Factor (70%), Followed By Diabetes Mellitus (40%), Smoking (30%), And Dyslipidemia (20%).

Graph 3: Type of Stroke



Incidence of Ischaemic Stroke Is 60 % which is most common followed by haemorrhagic Stroke which is 25% followed by Subarachnoid Haemorrhage 10% followed by Cerebral Venous Thrombosis

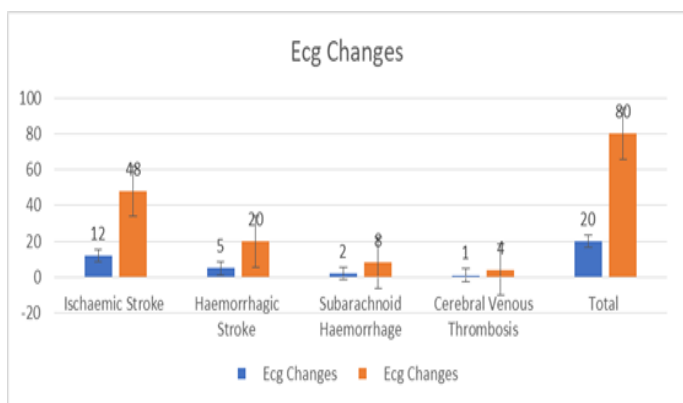
**Clinical Presentation**

Most Common Clinical Presentation is Hemiparesis (80%), Followed by Altered Sensorium (40%), Aphasia (30%), And Cranial Nerve Palsies (20%).

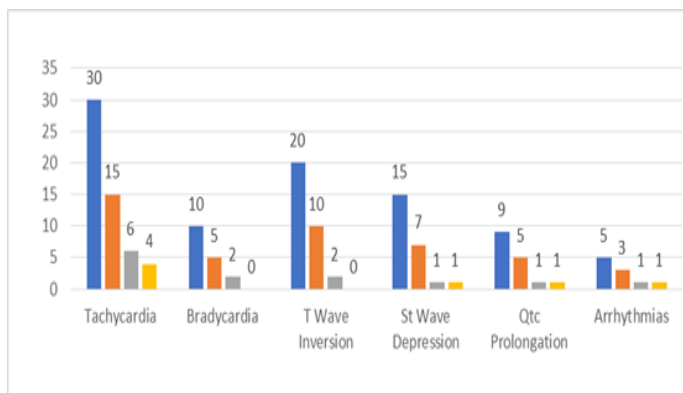
Table 1: Frequency distribution of clinical Presentation

Clinical Presentation	Frequency
Hemiparesis	80%
Altered Sensorium	40%
Aphasia	30%
Cranial Nerve Palsies	20%

Graph 4: Ecg Changes



Graph 5: Type of Ecg Changes



T Wave Inversion Being the Most Common (40%), Followed By St Segment Depression (30%), Qtc Prolongation (20%), And Arrhythmias (10%)

Table 2: Outcome of Patients According to Ecg

Outcome	Ecg Changes	
	Normal	Abnormal
Alive	19(95%)	64(80%)

Dead	1(5%)	16(20%)
Total	20	80

**Discussion**

The Male predominance (60%) is consistent with existing literature, as stroke incidence tends to be higher in males. Hypertension emerges as the most common risk factor (70%), underscoring its role as a major contributor to stroke. Addressing hypertension is crucial in stroke prevention programs. Diabetes mellitus, smoking, and dyslipidemia also contribute significantly to the risk, emphasizing, and the need for comprehensive risk factor management. Ischemic stroke is the most prevalent type (60%), aligning with global trends. It emphasizes the importance of interventions targeting thromboembolic events. Hemorrhagic stroke, though less frequent, carries substantial morbidity and mortality. The prevalence of subarachnoid hemorrhage and cerebral venous thrombosis is noteworthy, as they require specific management strategies. Altered sensorium, aphasia, and cranial nerve palsies represent diverse neurological manifestations, emphasizing the variability in clinical presentations. T wave inversion, ST segment depression, QTC prolongation, and arrhythmias on ecg highlight the cardiac consequences of stroke. The association between Ecg changes and the type of CVA, with more severe changes in hemorrhagic stroke, underscores the need for cardiac monitoring in these patients. The observation is right-sided lesions causes more Ecg changes than left-sided lesions, adds a nuanced layer to the understanding of the relationship between stroke location and cardiac manifestations.

**Sex**

Our study shows male preponderance which is similar to study by Suja Purushothaman, et al<sup>1</sup> which shows 71 % of Males

## Stroke

The most frequent type of stroke, ischemic stroke, occurs 60% of the time, followed by hemorrhagic stroke (25%), and subarachnoid hemorrhage. 10% is followed by cerebrovascular thrombosis, which is comparable to a study by Suja Purushothaman et al.<sup>14</sup> that indicates 58% of ischemic strokes. Additionally, research from Kuruvilla and Bharucha et al.<sup>15</sup> and Kumar et al.<sup>16</sup> shows that, respectively, 57.3 and 56%

## Risk Factors

The most frequent risk factor was hypertension (70%), which was followed by diabetes mellitus (40%), smoking (30%), and dyslipidemia (20%). It is comparable to the research conducted by Suja Purushothaman et al. India has a higher rate of stroke since risk factors including diabetes and hypertension are more common there.

## Mortality

Compared to patients with normal ECGs (5%), those with abnormal ECGs (20%) had higher mortality rates. This is comparable to a study by Suja Purushothaman et al.<sup>14</sup> that found that patients with abnormal ECGs (17.95%) had higher mortality rates than those with normal ECGs (9.09%).

## Ecg Changes

80% of patients in our study had ecg changes, which is comparable to 78% of patients in a study by Suja Purushothaman et al.<sup>14</sup>.

The most common condition in our study was T wave inversion (40%) followed by ST segment depression (30%), QTc prolongation (20%), and arrhythmias (10%). However, a study by Familoni et al. (2017) found that QTc prolongation was observed in 28% of cases, T wave inversion in 21.8%, and ST segment depression in 29.7%. In contrast, our study found that arrhythmias (10%) were present in 68% of cases, compared to 34.4% in their study.

## Conclusion

CVA is a prevalent and dangerous neurological condition that can alter the ECG and impact cardiac function. The type and location of CVA might affect the changes in the ECG, which can have implications for prognosis. As a result, it's critical to do electrocardiograms on all patients with CVA and to interpret the results in light of their neurological condition.

## References

1. Owolabi, M. O. et al. Dominant modifiable risk factors for stroke in Ghana and Nigeria (SIREN): A case-control study. *Lancet Glob. Health* 2018 6, e436–e446.
2. Kamalakannan, S. et al. Incidence and prevalence of stroke in India: A systematic review. *Indian J. Med. Res.* 2017 146, 175–185.
3. Banerjee, T. & Das, S. Fifty years of stroke researches in India. *Ann. Indian Acad. Neurol.* 2016 19, 1.
4. Khurana, S. et al. Burden of stroke in India during 1960 to 2018: A systematic review and meta-analysis of community based surveys. *Neurol. India* 2021 69, 547–559.
5. Damasceno, A. et al. An epidemiological study of stroke hospitalizations in Maputo, Mozambique: A high burden of disease in a resource-poor country. *Stroke* 2010 41, 2463–2469.
6. Cole W. *Neurology & Neurosurgery Library*. Oxford, UK: Theater; 1689. A physico-medical essay concerning the late frequency of apoplexies together with a general method of their prevention and cure: in a letter to a physician. [Google Scholar] [Ref list]
7. Definition and evaluation of transient ischemic attack: a scientific statement for healthcare

- professionals from the American Heart Association/American Stroke Association Stroke Council; Council on Cardiovascular Surgery and Anesthesia; Council on Cardiovascular Radiology and Intervention; Council on Cardiovascular Nursing; and the Interdisciplinary Council on Peripheral Vascular Disease. The American Academy of Neurology affirms the value of this statement as an educational tool for neurologists. Easton JD, Saver JL, Albers GW, et al. *Stroke*. 2009;40:2276–2293. [PubMed] [Google Scholar] [Ref list]
8. Stroke. Pollack A, Harrison C, Henderson J, Miller G. <https://www.racgp.org.au/afp/2014/march/stroke/> *Aust Fam Physician*. 2014;43:93. [PubMed] [Google Scholar] [Ref list]
  9. Lipid and glucose profile in patients with ischemic cerebrovascular accidents in Dakar] Ousmane C, Lemine DS, Fatoumata B, et al. *Pan Afr Med J*. 2016;25:29. [PMC free article] [PubMed] [Google Scholar] [Ref list]
  10. Mondal, M. B. A. et al. Prevalence and risk factors of stroke in Bangladesh: A nationwide population-based survey. *eNeurologicalSci* 2022 **28**, 100414.
  11. Banerjee, T. & Das, S. Fifty years of stroke researches in India. *Ann. Indian Acad. Neurol*. 2016 **19**, 1 .
  12. Habibi-Koolae, M. et al. Prevalence of stroke risk factors and their distribution based on stroke subtypes in Gorgan: A retrospective hospital-based study—2015–2016. *Neurol. Res. Int*. 2018, 1–7.
  13. Sridharan, R. Risk factors for ischemic stroke: A case control analysis. *Neuroepidemiology* 1992 **11**, 24–30.
  14. Purushothaman S, Salmani D, Prarthana Kg, Bandelkar Sm, Varghese S. Study Of Ecg Changes And Its Relation To Mortality In Cases Of Cerebrovascular Accidents. *J Nat Sci Biol Med*. 2014 Jul;5(2):434-6
  15. Kuruvilla T, Bharucha Ne. Epidemiology Of Stroke In India. *Neurol J Southeast Asia*. 1998;3:5–8
  16. Kumar Hh, Kalra B, Goyal N. A Study On Stroke And Its Outcome In Young Adults (15-45 Years) From Coastal South India. *Indian J Community Med*. 2011;36:62–5.
  17. Familoni Ob, Odusan O, Ogun Sa. The Pattern And Prognostic Features Of Qt Intervals And Dispersion In Patients With Acute Ischemic Stroke. *J Natl Med Assoc*. 2006;98:1758–62.