

ORIGINAL RESEARCH

## Study of clinical profile, risk factors & CT scan finding among patients with cerebrovascular accident at a tertiary care hospital

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### ABSTRACT

**Background:** Cerebrovascular accident or stroke is one among the three leading causes of death, surpassed only by ischemic heart disease and malignancy. Stroke is also a common cause of physical disability, which imposes a substantial burden to the community in the foreseeable future. It is estimated that the incidence of stroke is likely to increase by about 20% in the next 20 years. **Aim & Objective:** 1. To study clinical profile and risk factors in cerebrovascular accident. 2. study CT scan finding among cerebrovascular accident patients. **Methods:** Study design: Prospective Observational Study. Study setting: Medicine ward of tertiary care center. Study duration: 2017 to 2019

**Study population:** The study population included all the cases with stroke admitted at a tertiary care center. **Sample size:** 91. **Results:** The maximum incidence of stroke in this study was observed in the age group of above 60 yrs total -36, that is [18(19.78%)] each for 61-70 and >70 years of age. the male to female ratio in this study was 1.68:1. Most common risk factor was HTN 57.14%, DM 26.37, smoking 45.05%, Alcohol consumption 32.97%, Heart disease 20.88% and Hypercholesterolemia 10.99%. coronary artery disease was present in 12 patients (63.17%), rheumatic heart disease in 7 patients (36.83 %). CT Scan showed ischemic stroke in 86.81% and haemorrhage in 13.19%. 13 out of the 79 ischemic stroke patients and 09 out of the 12 haemorrhagic stroke patients were expired. **Conclusion:** Cerebrovascular accident cases were having male predominance with most common presentation among age group of 61-70years & more than 70 years. Hypertension was the commonest risk factor and other common factors were diabetes mellitus, cardiac disease, smoking. Ischaemic stroke constituted larger percentage of stroke and mortality was highest in haemorrhagic stroke. MCA territory was most commonly involved. CT scan was important for diagnosis of stroke as rational management depends on accurate diagnosis.

**Keywords:** cerebrovascular accident, HTN, DM, Hypercholesterolemia, CT scan

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## INTRODUCTION

Cerebrovascular accident or stroke is one among the three leading causes of death, surpassed only by ischemic heart disease and malignancy. Stroke is also a common cause of physical disability, which imposes a substantial burden to the community in the foreseeable future. It is estimated that the incidence of stroke is likely to increase by about 20% in the next 20 years.[1]

Stroke patients are at highest risk of death in the first weeks after the event, and between 20-50 per cent die within first month depending on type, severity, age, co-morbidity and effectiveness of treatment of complications. Patients who survive may be left with no disability or with mild, moderate or severe disability. Many surviving stroke patients will often depend on other people's continuous support to live [2]

Considerable spontaneous recovery occurs upto about 6 months. However, patients with history of stroke are at high risk of a subsequent event of around 10 per cent in the first year and 5 per cent year thereafter [3].

The proportion of stroke in the young population is significantly more in India than in developed countries; some of the more important causes for this are likely to be rheumatic heart disease, ischaemic strokes in peripartum period and arteriopathies as a sequale of CNS infections like bacterial and tubercular meningitis etc [4].

The prevalence rate of stroke in India is about 1.54 per thousand and death rate about 0.6 per 1000. The DALYs lost is about 600 per lac. Of the 56.9 million deaths worldwide in 2016, more than half (63.4) were due to the top 15 causes. Ischaemic heart disease and stroke are the world's biggest killers, accounting for a combined 15.2 million deaths in 2016. These diseases have remained the leading causes of death globally in the last 15 years [5].

The risk factors for stroke are similar to those for CHD, their relative importance differs [6]. Stroke epidemiology has lagged behind coronary artery disease, since strokes are not only less frequent, but occur later in life [7] Prevalence is difficult to measure because a large representative sample has to be identified as the denominator, a large proportion of that sample must be questioned and many past stroke episodes are forgotten by patients [8]

The mortality of stroke is on the decline in the recent years. However, it is unlikely that treatment of hypertension is responsible since the decline had started earlier and treatment cannot explain more than 25% of the decline [9]. Treatment of TIAs is also unlikely, largely because only a small proportion of strokes are preceded by TIAs [10].

## AIM AND OBJECTIVE

### OBJECTIVE:

1. To study clinical profile and risk factors in cerebrovascular accident.
2. Study CT scan finding among cerebrovascular accident patients.

## MATERIAL AND METHODS

**Study design:** Prospective Observational Study.

**Study setting:** Medicine ward of tertiary care centre

**Study duration:** 2017 to 2019

**Study population:** The study population included all the cases with stroke admitted at a tertiary care center

### INCLUSION CRITERIA:

- Patients of either sex with cerebrovascular accident admitted to ward and intensive care unit with symptoms and signs suggestive of acute loss of focal or global cerebral function.
- Evidence of ischaemia or haemorrhage on CT scan.
- Age more than 12 years

**EXCLUSION CRITERIA:**

- Patients with history of epilepsy, Patients presented with transient ischaemic attack.
- Age less than 12 years.
- Patients with bleeding diathesis
- Patient not willing to give consent.
- Patients with history of head injury.
- Patients in whom CT Scan brain could not be performed.

**Approval for the study:**

Written approval from Institutional Ethics committee was obtained beforehand. Written approval of medicine and Radiology department was obtained. After obtaining informed verbal consent from all patients with the definitive diagnosis of stroke admitted to medicine ward of tertiary care centre such cases were included in the study.

**Sample Size:** There were 91 eligible patients in the study. Out of total patients admitted for the stroke only 91 new cases satisfied the inclusion and exclusion criteria and had given written informed consent and were included in this study.

**Sampling method:**

**Complete enumeration method** i.e. all who participated and willing to take part were included in the study. There were 91 patients participated in the study.

**Methods of Data Collection and Questionnaire-**

A detailed history in each case regarding onset, predisposing factors and nature of stroke was recorded, followed by a thorough clinical examination. The major risk factors included in the study were hypertension, diabetes mellitus, hyperlipidemia along with other factors such as age, sex, menopause, puerperium which were evaluated. History of transient ischaemic attack was noted. In young patients family history of stroke and history of exposure to sexually transmitted disease were recorded.

Habituations to smoking, alcohol was noted. Special clinical evaluation of cardiovascular system giving importance to rhythm disturbances, cardiac failure, valvular heart disease, prosthetic valve was made.

Clinical neurological examination was done and the patients were grouped into those having cortical involvement, internal capsular involvement or brainstem involvement delineating the major blood vessels involved in the process. Ophthalmoscopic examination of the fundus was done. Patients with blood pressure readings of  $\geq 140/90$  mm Hg on two occasions was taken as hypertension.

Baseline investigations included complete blood count, blood sugar, urea, creatinine, electrolytes, cholesterol, urine analysis and chest x-ray. ECG was taken at admission, after 3 days and at discharge. CT Brain was done for all patients. CSF analysis was done in relevant cases. The results of all data are expressed in tabular forms for analysis. For the analysis of ECG, those patients giving a definite history or evidence of diabetes mellitus, coronary artery disease, rheumatic heart diseases, electrolyte disturbances or those on anti-arrhythmic drugs were avoided.

**Data entry and analysis:**

The data were entered in Microsoft Excel and data analysis was done by using SPSS demo version no 21 for windows. The analysis was performed by using percentages in frequency tables.  $p < 0.05$  was considered as level of significance using the Chi-square test

**RESULTS AND OBSERVATIONS****Table 1: Distribution of cases as per age**

Age in Years	Number (n=91)	Percentage
< 30	6	6.59

31 – 40	10	10.99
41-50	13	14.29
51 - 60	16	17.58
61 -70	18	19.78
≥71	18	19.78
<b>Total</b>	<b>91</b>	<b>100.00</b>

The maximum incidence of stroke in this study was observed in the age group of above 60 yrs total -36, that is [18(19.78%)] each for 61-70 and >70 years of age.

**Table 2: Distribution of cases as per Gender**

Sex	Number (n=91)	Percentage
Male	57	62.64
Female	34	37.36
<b>Total</b>	<b>91</b>	<b>100.00</b>

Majority of cases were males 57 and females 34, the male to female ratio in this study was 1.68:1.

**Table 3: Distribution of cases as per risk factors**

Risk Factors	Number	Percentage
Systemic Hypertension	52	57.14
Diabetes Mellitus	24	26.37
Smoking	41	45.05
Alcohol	30	32.97
Heart Disease	19	20.88
Abnormal lipid profile	10	10.99

Most common risk factor was HTN 57.14%, DM 26.37, smoking 45.05%, Alcohol consumption 32.97%, heart disease 20.88% and Hypercholesterolemia 10.99%. Coronary artery disease was present in 12 patients (63.17%), rheumatic heart disease in 7 patients (36.83 %).

**Table 4: Incidence of cardiac diseases associated with stroke**

Disease	Number (n=19)	Percentage
Coronary Artery Disease	12	63.17
Rheumatic Heart Disease	7	36.83
<b>Total</b>	<b>19</b>	<b>100.00</b>

Among the cardiac diseases, coronary artery disease was present in 12 patients (63.17%), rheumatic heart disease in 7 patients (36.83 %).

**Table 5: Clinical presentation**

Factors	Number	Percentage
Hemiparesis	82	90.11
Cranial nerve Involvement	81	89.01
Aphasia	29	31.87
Altered/Loss of consciousness	24	26.37
Sensory symptoms	7	7.69
Cerebellar	3	3.30
Headache	13	14.29
Vomiting	21	23.08

Hemiparesis was the commonest presentation in this study, present in 90.11% of patients., 26.37% of patients presented with loss of/ altered consciousness. Headache and vomiting were present in 13 and 21 patients respectively.

**Table 6: Nature of stroke**

Stroke	No	Percentage
Ischaemic (Thrombic+Embolic)	79(67+12)	86.81
Haemorrhagic	12	13.19

In this study, out of the 91 patients studied, CT Scan showed ischemic stroke in 86.81% and haemorrhage in 13.19%.

**Table 7: Distribution of arterial territory in ischemic stroke**

S.No.	Artery Involved	No (n=79)	Percentage
1.	MCA	69	89
2.	PCA	5	4.9
3.	Multiple	2	2.4
4.	MCA, PCA	1	1.2
5.	MCA, ACA	1	1.2
6.	ACA	1	1.2

Regarding the distribution of arterial territory in ischemic stroke, MCA was involved in 89%, PCA in 4.9%, ACA in 1.2%. Involvement of more than one arterial territory was observed in 4.8%(2.4+1.2+1.2%).

**Table 8: LOCATION OF HAEMORRHAGE**

S.No.	Factor	No	Percentage
1.	Putamen	4	33.33
2.	Cortical	4	33.33
3.	Thalamus	3	25
4.	Pons	2	16.67
5.	Cerebellum	1	8.33
6.	Subarachnoid Haemorrhage	1	8.33

Above table shows the location of the haemorrhage in the study patients as per CT Scan findings

**Table 9: PROGNOSIS**

Stroke	Death	
	No	%
Ischemic Stroke (n=79)	13	16.46
Haemorrhagic Stroke (n=12)	9	75.00

Loss of consciousness at the time of admission is considered to be an adverse prognostic factor. In this study, 13 out of the 79 ischemic stroke patients and 09 out of the 12 haemorrhagic stroke patients were expired.

## DISCUSSION

The maximum incidence of stroke in this study was observed in the age group of above 60 years total-36 that is [18(19.78%)] each for 61-70 and >70 years of age.

In this study incidence of stroke was most in the case of 61-70 and more than 70 years each having 18(19.78%) patients followed by 51-60 years 16(17.58%).

There were only 6 (6.59%) patients in the study who were <30 years old were least in number as compared to others age group.

According to Banford and Sandercock et al. [11] maximum incidence of stroke was in the above 70 years age group. The Framingham study (1979) showed that 80% of patients, were above 65 years of age.

In present study With regard to sex distribution, the male to female ratio in this study was 1.68:1. An epidemiological study by K.R. Dhamija et al.[12] recorded a male to female ratio of 1.7 : 1, which is very similar in accordance with this study. In a study by Das Gupta et al [13] male to female ratio was 1.3: 1, which is closer to this study. In the Madurai study by Aleem MA et al [14] the male to female ratio in young strokes was 1.1:1, which slightly lesser than this study.

In present study Most common risk factor was HTN 57.14%, DM 26.37, smoking 45.05%, Alcohol consumption 32.97%, heart disease 20.88% and Hypercholesterolemia 10.99%. Coronary artery disease was present in 12 patients (63.17%), rheumatic heart disease in 7 patients (36.83 %). In a study by Rahman KMN et al. [15] 78.82% of stroke patients were hypertensives, The incidence and severity of stroke are increased by the presence of diabetes and the outcome from stroke are poorer, according to a study by Baird TA et al [16].

According to a study by Williams CA et al [17] 33.3% of ischemic stroke patients and 26.3% of haemorrhagic stroke patients were smokers. A study on multiple cerebral infarcts done by B Reddy et al [18] showed 30% of stroke patients were alcoholics.

In present study Hemiparesis was the commonest presentation in this study, present in 90.11% of patients., 26.37% of patients presented with loss of/ altered consciousness. Headache and vomiting were present in 13 and 21 patients respectively. This is in accordance with the study by Rahman KM et al [15] where hemiplegia was present in 89.01%. 26.37% of patients presented with loss of/ altered consciousness. Headache and vomiting were present in 13 and 21 patients respectively.

In this study, out of the 91 patients studied, CT Scan showed ischemic stroke in 86.81% and haemorrhage in 13.19%. Studies by K.R.Dhamija et al [19] observed cerebral infarction in 82.6%, which closer with this study.

Loss of consciousness at the time of admission is considered to be an adverse prognostic factor. In this study, 13(16.46%) out of the 79 ischemic stroke patients and 9(75%) out of the 12 haemorrhagic stroke patients were expired. On an average, 69.2% of patients presenting with loss of consciousness died. Studies of IS Gambhir et al [20] state that level of consciousness at admission by Glasgow coma scale is a very important prognostic factor and 82.14% of patients with a score less than 8 expired.

Regarding the distribution of arterial territory in ischemic stroke, MCA was involved in 89%, PCA in 4.9%, ACA in 1.2%. Involvement of more than one arterial territory was observed in 4.8% (2.4+1.2+1.2%). Study by K. Srinivasa Rao et al. documented 54% in the MCA, 4.5% in the PCA, 4.5% in the ACA, and 27% at multiple sites.

## CONCLUSION

Cerebrovascular accident cases were having male predominance with most common presentation among age group of 61-70years & more than 70 years. Hypertension was the commonest risk factor and other common factors were diabetes mellitus, cardiac disease, smoking. Ischaemic stroke constituted larger percentage of stroke and mortality was highest in haemorrhagic stroke. MCA territory was most commonly involved. CT scan was important for diagnosis of stroke as rational management depends on accurate diagnosis.

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