



## Original Research Article

# Clinico-Radiological Profile of Stroke in Relation to Different Anatomical Sites: A Hospital Record Based Study

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## ABSTRACT

**Background:** Stroke or cerebrovascular accident (CVA) is the leading causes of morbidity and mortality in adult life. It is coming next to coronary heart disease and cancer as 3<sup>rd</sup> leading cause of death. The aim of this study is to evaluate the clinical presentation, risk factor and common anatomical site of brain in strokes patients.

**Methods:** This is a record based study taking 137 patients managed for stroke from July 2016 to December 2016. Computerised tomography (CT scan) was done in all patients.

**Results:** Out of 137 patients of cerebrovascular stroke, 86 are male & 51 female ranges from 26 years to 91 years with mean age is being (67±15.6) years. The male to female ratio is being 1.7:1. The cerebrovascular strokes are more common in males (62.7%) than females (37.3%). Most common age group is 61-70 years (37.3%) and the commonest clinical feature is hemiplegia (72.2%) followed by speech involvement (37.9%). Maximum cases presented with hypertension (57.7%) followed by dyslipidemia (23.4%). Ischemic stroke (70%) is higher than hemorrhagic (30%). most common site of hemorrhage is basal ganglia (43.9%) followed by thalamus (14.6%), both ventricular and cerebellar constitute 9.7% each. The most common site of infarction was parietal (41.7%), followed by basal ganglia (16.7%) and frontal (12.5%).

**Conclusions:** The cerebrovascular stroke is having hypertensive male predominance and the common clinical presentation is being hemiplegia followed by speech involvement which is more common compare to other studies.

**Abbreviations:** CVA- Cerebro Vascular Accident.

**Keywords:** CVA, Ischemic stroke, Hemorrhagic stroke.

## INTRODUCTION

WHO (World Health Organization) has defined stroke as “rapidly developing clinical signs of

focal or global disturbance of cerebral function, lasting for more than twenty four hours or leading to death, with no apparent cause other than

vascular origin"<sup>1</sup>. It is a collection of clinical syndromes resulting from cerebral ischemia to intracranial hemorrhage. It is the 3rd most common cause of morbidity and mortality in developed world <sup>2</sup>. Recent study identified that 7% of medical and 45% of neurological admissions are due to stroke with a fatality rate of 9% at hospital discharge and 20% by 28 days <sup>3</sup>. Diabetes mellitus, Hypertension, smoking, dyslipidemia and alcoholism, are the commonest cause of stroke. Ischemic strokes are contributing 50%-85% of all strokes worldwide and hemorrhagic strokes may be due to subarachnoid hemorrhage or intra-cerebral hemorrhage accounting for 1%-7% and 7%-27% respectively of all strokes worldwide <sup>5</sup>. CT scan is a widely available non-invasive investigation in patients with stroke. It is the modality of choice as an initial investigation in patients with stroke. The purpose of CT is to differentiate ischaemic stroke from haemorrhagic and to rule out other pathological conditions like tumour, which may present as stroke. It is considered as disease of elderly people but now a day's incidence has increased in young (20-27%) <sup>3</sup>. In U.S.A, stroke has 11% mortality while in India it comprises of 04% of medical admissions in major hospitals and 20% of disease of central nervous system <sup>4</sup>. The number of strokes has been increased from 1081480 in 2000 to 1667372 in 2015(6) as estimated by Indian national commission on macro-economic and health. Recent study projects reflect that the total deaths from stroke in India will increase remarkably by year 2020. The aim of this study is to evaluate various risk factors and anatomical regions involved in stroke which will help young physicians to prevent as well as treat this deadly and disabling disease.

## METHODS

This was a record based study of 137 cases managed for stroke from July 2016 to December 2016. The case notes of the patients were taken from the hospital records and the relevant data

extracted and analysed. CT scans were done in all the patients.

### Inclusion criteria

Patients above age 21 yrs with clinical and CT confirmed diagnosis of stroke.

### Exclusion criteria

Patients below 21 years, Stroke due to Trauma and tumour and CT scan of patients showing normal study.

### Ethical issues

This study confirms to the ethical principles of medical research developed by the World Medical Association Declaration of Helsinki. Ethical clearance was given by the institutional Ethics Committee S.C.B Medical College Cuttack, 753007.

### Data analysis

All data obtained from history taking, general examination and CT scan reports were analysed using the Graph Pad program for Windows (Graph Pad Software). Statistical significance was accepted when P value is  $\leq 0.05$

## OBSERVATION

Out of 137 patients 86 were males & 51 were females. The male to female ratio was being 1.7:1. The age range was from 26 years to 91 years with mean age was being (67±15.6) years. In this study youngest one was 26 years & oldest was 91 years old. The incidence of stroke is maximum in the age group of 61-70 years which comprises of 37.3% of total patients as shown in Table 1. Male patients (62.7%) were more than female (37.3%) patients.

**Table 1:** Age and Sex wise distribution of stroke cases

Age in years	No of cases	Percent	Male	Female	Ratio
21-30	01	0.7	01	00	1
31-40	05	3.6	03	02	1.5
41-50	21	15.3	13	08	1.6
51-60	33	24.1	20	13	1.5
61-70	51	37.3	31	20	1.6
71-80	21	15.3	14	07	2
81-90	04	2.9	03	01	3
91-100	01	0.7	01	00	1
Total	137	99.9	86(62.7%)	51(37.3%)	1.7

In the present study as shown in Table 2, most common clinical presentation was hemiplegia which was 72.2% followed by speech involvement (37.9%), altered sensorium (19.7%), convulsions (10.2%), instability of gait (6.5%), vomiting (4.3%) & headache (2.2%).

**Table 2:** Frequency and percentage of clinical features of stroke patients

Clinical feature	Frequency	Percent
Headache	03	2.2
Vomiting	06	4.3
Hemiplegia	99	72.2
Altered sensorium	27	19.7
Instability of gait	09	6.5
Convulsion	14	10.2
Speech involvement	52	37.9

As showed in Table no.3 the most common risk factor was hypertension (57.7%) followed by dyslipidemia 23.4%, smoking 15.3%, diabetes mellitus 13.1% and alcoholism 8%.

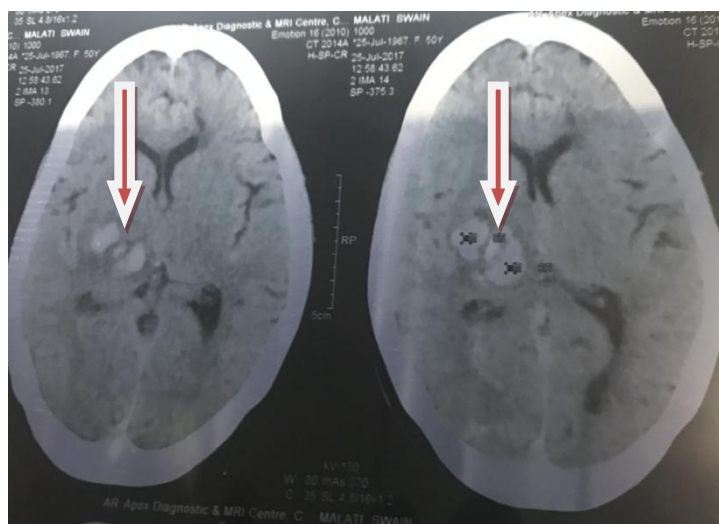
**Table 3:** Frequency and percentage of stroke risk factors

Risk factors	Frequency	percentage
Hypertension	79	57.7
Diabetes mellitus	27	13.1
Dyslipidemia	32	23.4
Alcohol	11	08.0
Smoking	21	15.3

The no. of ischemic stroke was being 96 (70%) and hemorrhagic stroke case was 41(30%) in both the sex. So most common type of stroke was ischemic (cerebral infarction). In both sex ischemic stroke presentation is more in comparison to hemorrhagic stroke (Table 4).

**Table 4:** Types of stroke Ischemic/ Haemorrhagic

	Ischemic stroke	Percentage	Haemorrhagic stroke	Percentage
Male	59	43	27	19.7
Female	37	27	14	10.3
Total	96	70	41	30



**Fig: I.** CT scan picture showing right basal ganglia haemorrhage



**Fig: II.** CT Scan showing left Parietal and basal ganglia infarct

### Middle cerebral artery (MCA Territory)

In our study most common site of hemorrhage was basal ganglia (43.9%) followed by thalamus (14.6%), both ventricular and cerebellar constitute 9.7% each. (Fig. 1).The most common site of

infarction was parietal (41.7%), followed by basal ganglia (16.7%) and frontal (12.5%) as shown in (Table no 5).These findings were consistent with involvement of middle cerebral artery (Fig. 2).

**Table 5:** Anatomical sites of cerebral hemorrhage & infract

Affected area of brain by CT Scan	Cerebral haemorrhage		Cerebral Infract	
	Frequency	Percent	Frequency	Percent
Pons	2	4.8	2	2.1
Midbrain	0	0	2	2.1
Thalamus	6	14.6	4	4.2
Basal ganglia	18	43.9	16	16.7
Paraventricular	0	0	4	4.2
Ventricular	4	9.7	0	0
Cerebellum	4	9.7	8	8.3
Frontal	4	9.7	12	12.5
Parietal	3	7.3	40	41.7
Temporal	0	0	2	2.1
Occipital	0	0	6	6.2
Total Lesions	41	100	96	100

### DISCUSSION

In the present study the mean is being age 67 years range 26 to 91 years and the common age group involved is between 61-70 years. The male to female ratio is being 1.7:1. So it is obvious that incidence of stroke is more common in elderly male as described in previous studies <sup>7,8,9, 10,12</sup>. Hemiplegia (72.2%) is the commonest clinical presentation followed by speech involvement (37.9%) and altered sensorium (19.7%) as described by Naik M et al and Chitrambalam et al <sup>(10, 11)</sup>. But in our case aphasia presentation is more common than other studies. The commonest risk factor is being hypertension (57.7%), dyslipidemia (23.4%) and diabetes mellitus (13.1%). This is similar to other studies <sup>7,8,13</sup>. Hence the risk factors associated with an increased risk of CVA are older age, male sex, hypertension, dyslipidemia and diabetes. Smoking and alcohol consumption are less likely contributory risk factor in comparison to other studies. In our study most common type of stroke is cerebral infarction (70%) and the second most common type of stroke is hemorrhagic stroke accounts for rest 30%. This pattern is similar to other studies <sup>7, 10, 14</sup>. Therefore the incident strokes of cases occurring in rural and urban areas of Odisha are revealing a

higher incidence of stroke due to cerebral ischaemia in comparison with haemorrhagic stroke. In our study most common anatomical site of hemorrhage is basal ganglia (43.9%) followed by thalamus(14.6%), both ventricular and cerebellar constitute 9.7% each. This is similar as studied by R. P. Eapen et.al, Abdul Rahman, et,al, Depmala A et,al <sup>7,13,15</sup>. The common site for infarction is being parietal (41.7%), followed by basal ganglia (16.7%) and frontal (12.5%) as studied by Naik M et al <sup>10</sup>.These findings are constituent with involvement of middle cerebral artery <sup>14</sup>.

### CONCLUSION

The occurrence of stroke rises with age with peak age between 60 to 70 years. This study showed male predominance in stroke cases. Cerebral infarction is more than intra cranial hemorrhage (I.C.H). In both sex ischemic stroke presentation is more in comparison to hemorrhagic stroke. Hypertension is commonest leading risk factors for both types besides dyslipidemia, DM, smoking, and alcohol intake. Most common clinical presentation is hemiplegia followed by speech involvement. In our study we found speech involvement more common than other studies. In

cerebral infarction most common site was parietal followed by basal ganglia, frontal and cerebellar. In hemorrhage most common site is basal ganglia followed by thalamus, ventricular and cerebellar. Physicians should counsel the patients about the risk factors and execute clear understanding about the anatomical regions involved in stroke, which will help them to prevent as well as treat this deadly and disabling disease.

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