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Indian	ARIPEN ST FA	UDY ON CLINICAL PROFILE AND RISK CTORS OF CEREBROVASCULAR ACCIDENT TH SPECIAL REFERENCE TO CT SCAN NDINGS OF BRAIN	KEY WORDS: Cerebrovascular accident, Hemorrhagic stroke, Hypertension, Ischemic stroke	
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Background: Stroke is one of the leading causes of morbidity and mortality in India. The objective was to stu			dia. The objective was to study the	

clinical profile, risk factors and type of stroke as per CT scan findings in patients with stroke. Methods: 50 cases of cerebrovascular accident confirmed after CT scan of brain over a period of 18 months (January

2018 to June 2019) were analysed.

ABSTRACT **Results:** The incidence of stroke was maximum in 61-80 years of age group. The average average \pm SD was 58.68 ± 16.73 in our study. 31(62%) patients had ischemic stroke and 17(34%) patients had intracerebral hemorrhage and 2(4%) had subarachnoid hemorrhage. The male to female ratio was 1.38:1. Hypertension (58%) was the most common risk factor.

Conclusions: In developing countries like India, there is a huge burden of stroke with significant morbidity and mortality. We will be extremely benefited if we assess the condition and prognosis of stroke patients by clinical parameters, risk factors stratification, CT scan of brain and electrocardiographic changes.

INTRODUCTION:

The term Cerebrovascular accident (CVA) or stroke is used to describe a neurological deficit resulting from disease of cerebral vessels.WHO defines stroke as "a rapidly developed clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than vascular origin".[1] The 24 hours threshold in the definition excludes transient ischemic attack.

Worldwide, stroke is the second leading cause of mortality after coronary artery disease causing 6.2 million deaths in 2015. [2,3] In 2016 it was estimated that CVA accounted for 5.78 million deaths worldwide, equivalent to 10.2% of all deaths.[4] AWHO collaborative study in 12 countries shows a stroke incidence rate of 0.2 to 2.5 per 1 thousand population per year. In the West approximately 500000 cases of stroke occur yearly with 175000 deaths from stroke.

Some of the recent studies have demonstrated the stroke pattern to considerable extent in our country with a prevalence rate 471/100000 population. [5] The estimated adjusted prevalence rate of stroke range, 84-262/100,000 in rural and 334-424/100,000 in urban areas.[6] The cumulative incidence of stroke ranged from 105 to 152/100,000 persons per yearin india.[7]

Recent studies identified that 7% of medical and 45% of neurological admissions were due to stroke with a mortality rate of 9% at time of discharge and 20% at 1 month.[8] Hypertension, alcoholism, smoking and dyslipidemia are the most common causes of stroke among the elderly and smoking, alcoholism, cardiac disorder like mitral stenosis (MS) with atrial fibrillation (AF), increased body mass index, Diabetes Mellitus (DM) and hypertension are significantly associated with stroke among young people.[9]

In Indian scenario, WHO estimated that in 2016, 0.76 million people died due to stroke in which 0.372 million were men and 0.334 million were women. The crude death rate of stroke was about 54.2/100,000 population.[5]

Ischemic stroke may be due to an obstruction within the blood vessel that supplies blood to the brain. Hemorrhagic stroke occurs due to the weakening of blood vessel which would rupture and bleed into the surrounding brain tissues. This

blood would accumulate and compress the surrounding tissues.[10,11] Ischemic and hemorrhagic stroke accounts for about 85% and 15%, respectively.[3]

MATERIALS AND METHODS :

The present study was conducted in the Department of General Medicine, Nalanda Medical College and Hospital after obtaining clearance from the institutional ethics committee. Cases were selected from the patients admitted in the General Medicine ward during the period from January 2018 to June 2019. Fifty cases of cerebrovascular accidents were studied in the present series after obtaining informed consent for participation in the study from the patient and/or patient party.

Inclusion Criteria

All patients admitted in medicine department and having CT confirmed diagnosis of ischemic or hemorrhagic stroke.

Exclusion Criteria

- transient ischemic attack
- Stroke due to trauma (head injury).
- Coagulation disorders, AV malformations, ICSOL.
- infection of central nervous system presenting as cerebrovascular accident.

All the patients fulfilling the inclusion and exclusion criteria were subjected to NCCT scan head. Findings of brain computerized tomography (CT) scan performed were used for classification of the type of stroke into ischemic and hemorrhagic. All the patients were assessed clinically through detailed history and clinical examination.

From the history, various demographic variables were collected including age, sex, history of transient ischemic attack/stroke, hypertension, diabetes mellitus, heart disease and addiction. Routine hematological and biochemical tests including Hemoglobin (Hb), serum urea, serum creatinine, blood sugar, and lipid profile were done.

Hypertension was defined per the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure JNC VII criteria during the respective period of registry.[12] Diabetes Mellitus was defined according to the ADA guideline of elevated fasting blood glucose ≥126

mg% or HbAlc \geq 7% or previously on oral hypoglycemic or insulin injections.[13] Dyslipidemia was defined using the National Cholesterol Education Programme-Adult Treatment Panel III (NCEP-ATP III) criteria as serum triglyceride concentration of >150mg%, cholesterol concentration of >200 mg%, and or high-density lipoprotein concentration of <40 mg% in males and less than 50 mg% in females.[14] Smoking was defined as usage of more than 10 cigarettes/d for more than 1 year and Consumption of ≥30 g of ethanol per day were labeled as alcoholic.

Statistical analysis - All the data was fed on excel spreadsheet, and statistical analyses were made using SPSS version 21.0 software. Results were expressed in average±SD, frequencies and percentages.

Results:

Table 1: Type of index stroke.

Type of stroke	No of patients n (%)	
Ischemic stroke	31 (62%)	
Intracerebral hemorrhage	17 (34%)	
Subarachnoid hemorrhage	2 (4%)	

Table -2 Proportion of patients belonging to different age groups in both sexes

Āge	Sex		Total	Percentage
groups (years)	Male (%) (n = 29) (58%)	Female (%) (n= 21) (42)		
21-40	4	3	7	14
41-60	11	7	18	36
61-80	13	9	22	44
81-100	1	2	3	6

In this present study 50 cases of CVA were included that fulfills inclusion and exclusion criteria. All the cases were studied for the clinical presentation, risk factors, neurological presentation, pattern of brain strokes as per CT scan findings. Table 1 shows that ischemic stroke was found to be the commonest lesion 62% followed by Intracerebral hemorrhage (ICH) in 34% and subarachnoid hemorrhage (SAH) in 4 % of cases. Table 2 shows that the incidence of stroke is maximum in 61-80 years of age group which comprises 44% of total patients, followed by 41-60 years of age group which comprises 36% of total patients. 16.81% patients were of age ≤45 years. In our study, the youngest patient was 23 years old female and oldest was 92 years old female. In this present study 29 (58%) were male and 21 (42%) were female. Male and female ratio was 1.38:1. The average $age\pm SD$ were 58.68 \pm 16.73 years in our study.

Table - 3 Groups of cerebrovascular accidents in the present series with their age distribution

Age groups (Years)	Ischemic stroke	Intracerebral hemorrhage	Subarachnoid hemorrhage
21-40	3	2	1
41-60	12	6	1
61-80	13	9	-
81-100	3	-	-

Table 3 showing the age distribution of different types of stroke. In this study, maximum number of cases of ischemic stroke found in the age group 61-80 years, was 13 cases out of 31 (41.93%).

Cases of ICH were also found most commonly in the age group 61-80 years (52.94%) in this study. Cases of subarachnoid hemorrhage were found in age group 21-40 (1 case) and 41-60 (1 case) years age group only.

Table -4 Risk factors of stroke Percentage **Risk Factors** No of cases Hypertension 29 58 Dyslipidemia 23 46 Smoking 18 36 Diabetes Mellitus 17 34 Past history of 10 20 TIA/stroke Ischemic Heart 8 16 disease Alcoholism 7 14 Atrial fibrillation 4 8 Rheumatic heart 4 8 disease

Table -4 shows that the commonest risk factor of stroke is hypertension (58%) followed by dyslipidaemia (46%), smoking (36%) and diabetes mellitus (34%). There was past history of TIA or stroke in 20% of patients. (16%) patients had ischemic heart disease, 14% was cases of over alcoholism,8% was of atrial fibrillation and 8% had rheumatic heart disease. Many of the cases under study had multiple or overlapping risk factors. Table 5 shows the quantitative parameters of the stroke patients. The Mean (\pm SD) systolic blood pressure was 165 \pm 30.79 mm Hg and mean diastolic pressure was 95.2 \pm 19.51 mm Hg in 50 cases of stroke.

Table 5: Quantitative parameters of patients.

Parameters	Mean±SD
Systolic BP (mmHg)	165±30.79
Diastolic BP (mmHg)	95.2±19.51
Haemoglobin (g/dL)	10.78±1.56
Total cholesterol (mg/dL)	205.39±48.99
Triglyceride (mg/dL)	151.76±47.43
HDL (mg/dL)	48.5±9.52
LDL (mg/dL)	123.4±20.61
Serum urea (mg/dL)	42.3±23.1
Serum creatinine (mg/dL)	1.42±0.7

Table	-6	Premonitory	Symptoms	in	different	types	of
stroke							

Premonitory symptoms	Ischemic stroke (n=26)	Intracerebral hemorrhage (n= 17)	Subarachnoid hemorrhage (n =2)
Headache	11 (42.30%)	11(64.70%)	2(100%)
Vomiting	2 (7.69%)	7 (41.17%)	2(100%)
Dizziness	7(26.92%)	6(35.29%)	1(50%)

Among the 50 patients, 28(56%) had premonitory symptoms. Majority of patients of ischemic stroke had headache (42.30%) and dizziness (26.92%) as premonitory symptoms but only 2 cases (7.69%) of ischemic stroke presented with vomiting as premonitory symptom. But in haemorrhagic stroke most patients presented with headache (64.70%) followed by vomiting (41.17%) and dizziness (35.29%). Almost all patients (100%) of subarachnoid haemorrhage presented with headache and vomiting. Many of the patients had more than one symptoms.

Table-7: Incidence of Electrocardiographic changes indifferent groups of CVA

Type of stroke	Total no of cases (n =50)	No of cases with normal E. C. G. (n =29)	No of cases with abnormal E. C. G. (n= 21)	
Ischemic stroke	31	21(67.74%)	5(16.13%)	

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Intracerebral haemorrhage	17	7(41.17%)	10(58.82%)
Subarachnoid haemorrhage	2	1(50%)	1(50%)

Table 7 shows E.C.G changes in stroke. In this study 21 cases (42%) out of 50 cases had various changes in electrocardiography. E. C. G. was abnormal in 58.82% and 50% in intracerebral haemorrhage and subarachnoid haemorrhage respectively. Only 16.13% cases of ischemic stroke had abnormal E.C.G.

DISCUSSION:

In the present study out of 50 cases, 31(62%) cases had ischemic stroke, 17(34%) cases had intracerebral haemorrhage, and 2 (4%) cases had subarachnoid haemorrhage. Behera BP et.al reported 60.43% ischemic stroke and 39.57% of haemorrhagic stroke in his study.[15] Sridharan SE found that 83.6% were ischemic strokes, 11.6% intracerebral hemorrhages, and 4.8% subarachnoid haemorrhages, respectively.[16] Dalal PM et al (2008) found 80.2% were ischemic strokes and 17.7% hemorrhagic strokes in his study.[17]

There is high incidence of ischemic stroke among various cerebrovascular accidents in various studies. [5,16,17] of Ischemic stroke was also the commonest form cerebrovascular accident in this present study. Our study thus tallies with those of our predecessors.

The youngest patient in this series was a female aged 23 years and the oldest patient in this series was also a female aged 92 years. Maximum number of cases in both sexes were in between 61-80 years (44%). Least common age group in this series was between 81-100 years (6%).

In this study 14% of stroke patient had age < 40 years which closely correlates with study done by Patne SV et al who have 16.26% and by Gauri et al who have 19%.[18,19] The male to female ratio was 1.46:1 which correlates with study done by Patne SV et al, with M: F ratio was 1.4:1.[18] From above observation it can be concluded that incidence of stroke is more common in male sex which correlates with the study done by Aiyar et al, Pinhero et al. [20,21] Both ischemic stroke and ICH were found more commonly in the age group 61-80 years, 50% and 52.94% respectively.

In our present study 58% of patients with stroke had hypertension. Mean systolic blood pressure was 165 ± 30.79 nm Hg and mean diastolic blood pressure was 95.2 ± 19.51 nm Hg in our study. In study of Vaidya CV et.al 25% cases of stroke had hypertension.[22] In study by Kalita J et.al of younger subjects (18-50 years) with hemorrhagic stroke has been studied and found hypertension in 57% of cases.[23] Behera BP et al found 83.81% cases of stroke with hypertension.[15]

In present study, dyslipidemia was 46% which was less than findings of Behera BP et al (53.99%) and much more as compared with study done by Abdu-Alrhaman Sallam et al (13.9%), Eapen et al (17%).[9,15,24] In present study there was anemia in 20% cases which is more commonly associated with ischemic stroke patients which is correlated with Eapen et al study where anemia was found in 33% cases.[9]

In our study 7(14%) patients were alcoholic and all of them were male. In study of Kalita J et al. 15.5% patients were alcoholic.[23] Behera BP et al. reported that 17.49% patients of stroke were alcoholic.[15]

In our present study 36% of the stroke patients were smoker. The ICMR risk factor study for cerebrovascular diseases confirm that tobacco use (smoking / chewing) as significant risk factor in both sexes in all age groups.[25] In the Trivandrum registry (2009) 26.8% of stroke patients were smoker.[16]

In the present study 10 (20%) patients had past history of either stroke or TIA. RK Dhamija et.al found 22% of recurrent stroke in india. [26] Behera BP et.al found that 12.77% of ischemic stroke and 3.49% of haemorrhagic stroke had past history of stroke. [15]

In this study 12 (24%) patients with stroke had underlying heart disease, which is higher than the observation made by Behera BP et.al.[15] Out of these 12 patients, 8 (16%) patients had ischaemic heart disease and 4(8%) patients had rheumatic heart disease. Kaul S et al. reported that among cardioembolic stroke, rheumatic heart disease (29%) and ischemic heart disease (27%) are predominant causes.[27]

In our study 17 (34%) patients had diabetes mellitus. There is a wide variation among stroke patients in different published series. P.M. Dalal et al ICMR multi centric study on risk factors reported that high blood sugar is an important risk factors for stroke in elderly and young subjects in either sex. [25] In study of Sridharan et al. (2009) in The Trivandrum Stroke Registry, half of the patients had diabetes mellitus. [16] Behera BP (2019) et al. reported that 6.96% of the stroke patients were diabetic. [15] So, the present study report shows higher incidence of DM in our set-up.

In our study 64% of the patients were from urban and 36% patients were from rural areas This finding correlates with study done by Sridharan SE et.al.[16]

Electrocardiographic changes were present in 21 cases (42%) out of 50 cases in this study. In systemic review by Khechinashvili G et al. found that abnormalities, such as ischemic-like ECG changes and/or QT prolongation, were found in 76% of patients with subarachnoid hemorrhage, irrespective of whether they had pre-existing heart disease or not. Such ECG changes were present in more than 90% of unselected patients with ischemic stroke and intracerebral haemorrhage.[28]

CONCLUSION:

In developing countries like India, there is a huge burden of stroke with significant morbidity and mortality. The occurrence rises with age with peak between 61 to 80 years. Young patients (age \leq 40 years) were 14 % of patients which is more concerned in view of productive year lost. This study showed male predominance in stroke cases. Cerebral hemorrhage was more than infarction. Hypertension was amongst leading risk factors. After hypertension, dyslipidemia, smoking/ tobacco chewing, DM, past history of CVA or TIA, heart disease, and alcohol intake were other risk factors of stroke. So, it is strongly recommended that there should be strict control of blood pressure, dyslipidemia, cessation of smoking/tobacco chewing and alcohol intake for prevention of stroke. Hence from the present study it can be concluded that we will be extremely benefited if we assess the condition and prognosis of stroke patients by clinical parameters, risk factors stratification, CT scan of brain and electrocardiographic changes, and thereby we can decide to whom specialised intensive medical care should be given because specialised intensive care cannot be possible for each and every patient of stroke in our set up.

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