ORIGINAL ARTICLE

A CLINICAL STUDY OF STROKE IN YOUNG

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ABSTRACT: INTRIDUCTION: Stroke is one of the important causes of morbidity and mortality all over the world. Incidence of stroke steadily increases with age. Experts are concerned of the emerging stroke epidemic in India. Stroke affecting the young has potentially devastating consequence son the individual and his family. Certain risk factors are unique to the young. It needs more studies for identification and modification of risk factors. The study aims to evaluate clinical features, risk factors, etiology and mortality of stroke in young patients. **METHODS:** 74 young patients satisfying the inclusion criteria were included in this study. A detailed history was taken from young stroke patients, systemic examination and required investigations were done. Data was collected in standardized proforma and analysed. **RESULTS:** Stroke in young accounts for 7.95% of stroke cases of all age groups. The mean age of the patients was 34.66 ± 7.48 years. Among 74 patients, 47(63.51%) were male and 27(36.49%) were female. Seizures, decreased consciousness, speech involvement and motor deficit were observed in 33.78%, 44.59%, 22.97% and 100% of cases respectively. 82.43% patients had ischemic and 17.57% patients had hemorrhagic stroke. Among ischemic stroke, large artery atherosclerosis was 16.21%, tuberculous meningoencephalitis with vasculitis was 16.21%, lacunar stroke was 10.81%, CVT was 10.81% and cardio embolic stroke was 6.76%. Smoking (59.45%), alcoholism (58.10%), hypertension (43.24%), coronary artery disease (8.10%), diabetes mellitus (10.81%), elevated total cholesterol (25.67%), elevated low density lipoproteins (22.97%), elevated triglycerides (27.02%) and low HDL (22.97%) were important risk factors. Carotid doppler was abnormal in 9.45% of patients. 6.76% patients had mitral stenosis in echocardiogram. Low protein C and protein S were found in 1.35% of patients. Eight (10.81%) patients died during the hospital stay. **INTERPRETATION AND CONCLUSIONS:** The major risk factors for stroke were hypertension, dyslipidemia, smoking, alcoholism and diabetes mellitus. Ischemic stroke was more common than hemorrhagic stroke. CVT was common in postpartum women. 58% of TB meningoencephalitis patients have AIDS. Mortality was higher in hemorrhagic stroke.
KEYWORDS: Stroke; CVT; Lacunar stroke; Mitral stenosis; Tuberculous meningitis; Mortality.

INTRODUCTION: Stroke is a global health problem. It is one of the important causes of morbidity and mortality all over the world. Stroke causes long-term disability and has tremendous emotional and socioeconomic consequences in patients, their families and society. In the last four decades, there is more than 100% increase in stroke incidence in low to middle income countries, but a 42%decrease in high-income countries.[1]

Stroke mortality rates are declining or stabilizing in developed countries, experts are concerned of the emerging stroke epidemic in India.[2] As life expectancy is increasing, India will likely face a significant socioeconomic burden to meet the costs of managing stroke.[2] Recent

study identified that 7% of medical and 45% of neurological admissions were due to stroke with a fatality rate of 9% at hospital discharge.[3]

AGE AND STROKE INCIDENCE: Age is an independent risk factor for stroke. It has strong association with the incidence of stroke. It steadily increases with age. Indian studies have estimated that the prevalence rates Increase from 0.1-0.3/1000 in the <45 year age group to 12-20/1000 in the 75-84 year age group.[4] Similarly, the incidence rates increase from 27-34/100,000 in the 35-44 age groups to 822-1116/100,000 in the 75+ age group.[2,5] In India, the prevalence of stroke in younger individuals is high (18-32% of all stroke cases) compared with high-income countries.[2] Most of the studies of stroke in young included subjects from second to fourth or fifth decade, in general, stroke in young imply people in between the age group of 15-45 years. The average age of patients with stroke in developing countries is 15 years younger than that in the developed countries. The etiology may vary with different age groups, but most of the risk factors are common to all age groups. Still, certain factors are confined and unique to the young. Stroke affecting the young has potentially devastating consequences on the individual, his family and society. Several studies have analyzed the risk factors of stroke in young, but considering its impact on younger generation, it needs more studies for identification and modification of risk factors.

MATERIAL AND METHODS: This is a hospital based prospective study conducted in Six medical wards and acute medical care ward in department of general medicine, SVRRGGH, S. V. Medical College, Tirupati during the period of November 2011 to July 2013.

INCLUSION CRITERIA INCLUDED: Age between 15-45 years, Patients with focal or global neurological deficit attributable to vascular cause and persist for more than 24 hours.

EXCLUSION CRITERIA INCLUDED: Age <15 and >45 years, Traumatic cause of focal deficits, Patients whose radiological workup does not confirm stroke, Patients unwilling to participate in the study. Written informed consent was taken from all patients. Patients who satisfied the inclusion criteria were included in this study. A proforma was prepared which include detailed history, clinical examination and required investigations. History includes all symptoms pertaining to the stroke in detail with emphasis on all risk factors. A complete clinical examination is done for neurological deficit. Relevant investigations like hemoglobin, total white cell count, erythrocyte sedimentation rate, blood sugar, blood urea, serum creatinine, test for HIV, CT scan brain were performed in all patients. Coagulation profile, ANA, anti-dsDNA, antiphospholipid antibodies, CSF analysis, carotid doppler and echocardiogram were performed in selected patients. Data was collected in standardized proforma from all the subjects. Data collected in a predesigned proforma was managed using Excel 2007. All the entries were double-checked for any possible error. Descriptive statistics for the categorical variables were performed by computing the frequencies (percentage) in each category Epi info software was used to calculate P value for statistical significance.

P value <0.05 -Significant.

P value>0.05 - Not significant.

RESULTS: In the study period from November 2011 to July 2013, 930 stroke cases of all age groups were admitted in acute medical care ward and medical wards. Among them 74 young patients satisfying the inclusion criteria were included in this study. Stroke in young accounts for 7.95% of total stroke patients admitted. 23 of them were admitted in acute medical care ward.

1. **AGE AND SEX DISTRIBUTION:** The mean age of study population was 34.66±7.34 years. Mean age for male and female in study group was 36.51±6.2 and 31.44±8.04 respectively. Male and female patients in our study were 63.51% and 36.49% respectively.

Age Group	No (%)
15-20	3 (4.05%)
21-25	8 (10.81%)
26-30	12 (16.21%)
31-35	15 (20.27%)
35-40	20 (27.02%)
41-45	16 (21.62%)
Total	**74 (100%)**
Mean ± standard deviation	34.66±7.34

Table 1: Age distribution in study population

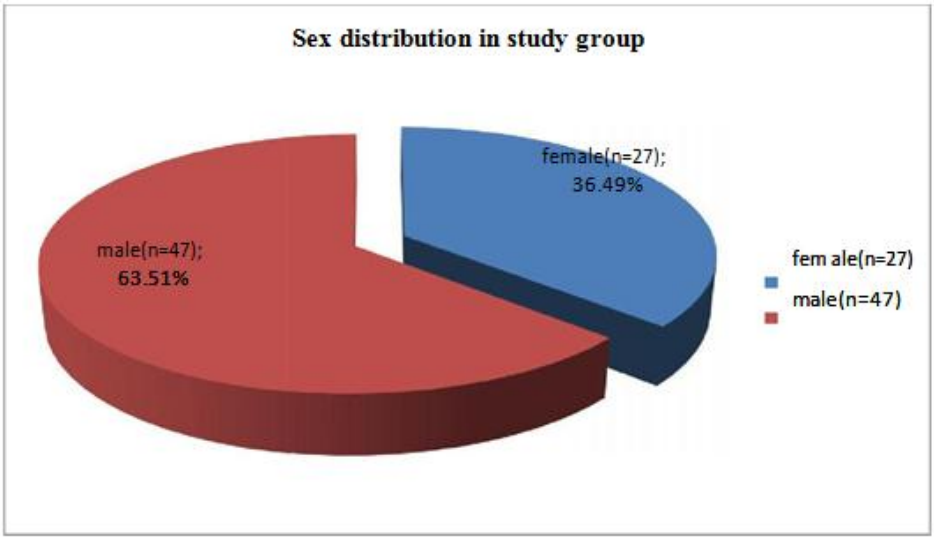

Fig. 1

Clinical features	Number (n)	Percentage %
Impaired conscious level	33	44.59%
Seizures	18	24.32%
Generalised tonic clonic seizures		

Focal	7	9.45%
Speech involvement	17	22.97%
Motor deficit	74	100%
Right upper and lower limbs	34	45.95%
Left upper and lower limbs	40	54.05%
Cranial nerves involvement	60	81.08%
Facial nerve		
Glossopharyngeal and vagus nerves	5	6.74%
Sensory deficit	1	1.35%
Cerebellar deficit	2	2.7%
Meningeal irritation signs	11	14.86%

Table 2: Clinical features in study group

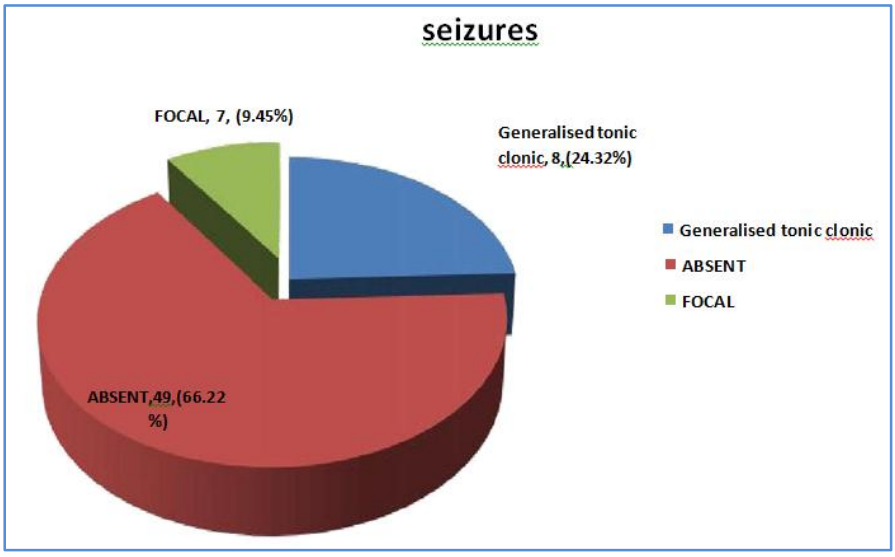

Fig. 2

RISK FACTORS: Smoking (59.45%) and alcoholism (58.10%) were the two important risk factors in our study. Hypertension (43.24%), diabetes mellitus (10.81%), transient ischemic attacks (6.75%) and coronary artery disease (8.1 0%), family history of stroke (2.70%), atrial fibrillation (4.05%) and carotid stenosis (9.45%) were other significant risk factors which causes stroke is shown in table 6. Statistically significant difference (P value<0.05) between male and female was found with respective risk factors like hypertension, smoking and alcoholism. In the remaining risk factors it was found that there was no statistical significant difference (P value >0.05) between males and females. Multiple risk factors were common than single risk factor in study population. 2 and 3 risk factor s in a patient was present in 32.43% and 28.37% of study population respectively. Multiple risk factors in study group is shown in table.

No. of Risk Factors	No. of Patients	Percentage
1	11	14.86%
2	24	32.43%
3	21	28.37%
4	15	20.27%
5	3	4.05%

Table 3: Multiple risk factors in study group

LIPID PROFILE: Fasting lipid profile was performed in all patients included in our study and was classified as per National Cholesterol Education Program-Adult Treatment Panel (NCEP-ATP).

III guidelines.[6] Total cholesterol, triglycerides, low density lipoprotein (LDL) and high density lipoprotein (HDL) cholesterol levels in study population are shown in figures 10, 11, 12 and respectively.

TOTAL CHOLESTEROL: In 74 patients 13.51% (n =10) had borderline elevated total cholesterol and 12.16% (n=9) had high total cholesterol as per ATP III guidelines.[6]

LOW DENSITY LIPOPROTEINS (LDL): 22.97% (n=17) of study population had elevated low density lipoproteins levels.

TRIGLYCERIDES: Mild elevation of triglycerides was found in 8.11% (n=6) of patients, border line elevation in 17.57% (n=13) of patients and 1.35% (n=1) had very high triglyceride levels as per NCEP-ATP III guidelines.[6]

HIGH DENSITY LIPOPROTEINS: 16.22% (n=12) patient s in our study had significantly low HDL as per NCEP-ATP III guidelines.[6]

ECHOCARDIOGRAPHY AND CAROTID DOPPLER: Echocardiography for looking Regional wall motion abnormalities (RWMA), screening for valvular heart disease was performed in 60 patients. Echocardiography showed regional wall motion abnormality suggestive of coronary artery disease in 6(8.10%) patients and rheumatic heart disease with mitral valve involvement in 5(6.76%) patients. Doppler of carotid vertebral arteries was done in 52 patients in study population. Abnormal carotid doppler was reported in 7(9.45%) patients.

COAGULATION PROFILE: Bleeding time (BT), clotting time (CT) were measured in all patients, prothrombin time (PT), activated partial thrombo plastin time (aPTT), international normalized ratio (INR) were measured in 31 patients included in the study. Bleeding time (BT) was normal in all patients. Two (2.70%) patients had abnormal clotting time (CT), prothrombin time (PT), activated partial thromboplastin time (aPTT) and International normalized ratio (INR). Free protein C and S were done in selected patients (n=31) with ischemic stroke. Low protein C was

found in 1(1.35%) patient and 1(1.35%) patient ha d low protein S. Antiphospholipid antibodies were present in 2(2.70%) patients.

VASCULITIS WORK UP: Serology for anti-nuclear antibody (ANA), anti-double stranded deoxy nucleic acid antibody (dsDNA) and antiphospholipid antibody were performed in 39 patients with ischemic stroke. ANA, dsDNA and antiphospholipid antibody were positive in 2(2.70%), 1(1.75%) and 2(2.70%) patients respectively. 2(2.70%) patients had takayasu arteritis and 1(1.35%) patient had systemic lupus erythematosus (SLE). Lumbar puncture was done in 19 patients; it was abnormal in 14 patients. 9(12.16%) patients serology was positive for human immuno deficiency virus. 12(16.21%) patients had tuberculous meningoencephalitis with vasculitis, 1(1.35%) patient had HIV vasculitis, and 1(1.35%) patient had viral meningoencephalitis with vasculitis. Among 9 Human immunodeficiency virus positive patients, 4 patients had tuberculoma and 3 patients had tuberculous meningitis. Vasculitis in study group is shown in figure.

Fig. 3: Vasculitis in subjects included in the study.

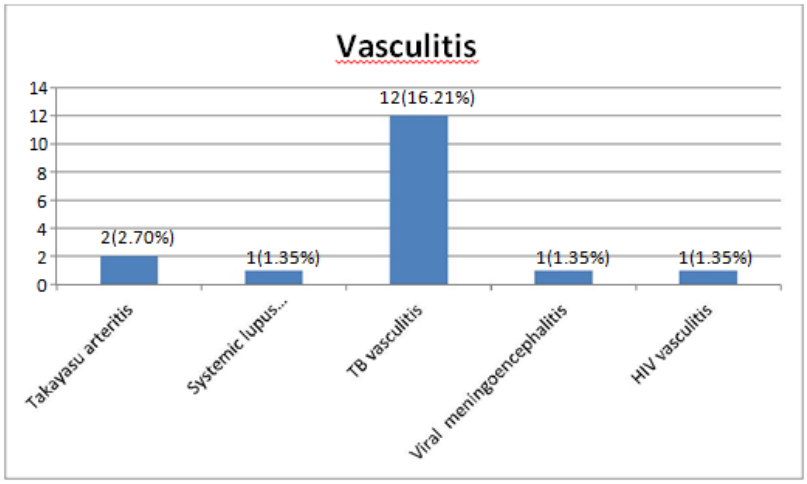

Fig. 3

Computed Tomography (CT) of brain was done in all 74 patients. Ischemic stroke with various arterial territory involvements was found in 43(58.10%) patients. Middle cerebral artery.

n=27 (36.86%) was commonly involved followed by posterior cerebral artery n=6(8.11%) and anterior cerebral artery n=2(2.70%). CT scan shows hemorrhagic stroke, cerebral venous sinus thrombosis, tuberculoma and brain tumor in 17.57%, 10.81%, 6.76% and 6.76% respectively. Various images of CT brain in study population are shown in figures.

MORTALITY: Eight (10.81%) patients in study population died during the hospital stay are shown in figure 23. Deaths in male and female patients were 5 and 3 respectively is shown in figure 24. Among 8 expired patients, 6 patients had hemorrhagic stroke, 1 patient had HIV positive serology with tuberculoma and 1 patient had cerebral venous sinus thrombosis. Mortality in hemorrhagic stroke patients was 46.15%. Mortality in ischemic stroke patients was 3.27%.

Fig. 4: CT scan A and B showing acute infarct in left and right MCA territories respectively.

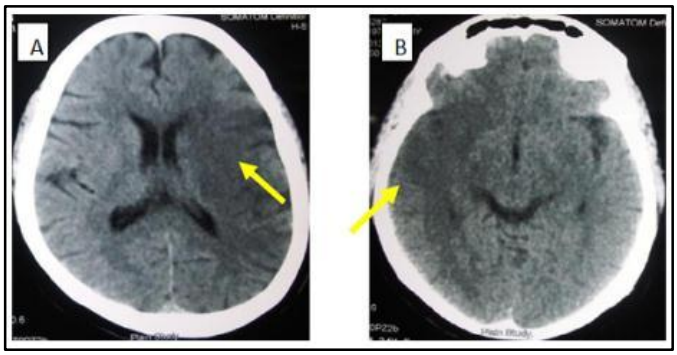

Fig. 4

Fig. 5: CT scan showing acute intracerebral bleed in right capsuloganglionic region.

Fig. 5

Fig. 6: CT brain plain showing superior sagital sinus thrombosis with haemorrhagic infarct in the right frontal lobe with midline shift.

Fig. 6

Fig. 7: CT brain plain showing glioma in left temparoparietal region.

Fig. 7

Fig. 8: CT brain plain showing tuberculoma in right frontal region A) Before contrast B) After contrast.

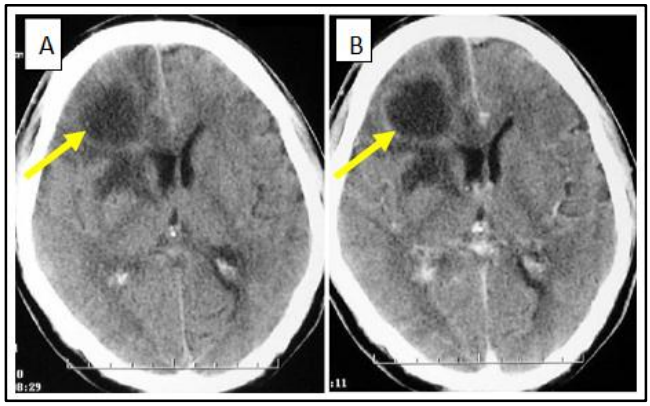

Fig. 8

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