



DEMOGRAPHIC AND RISK FACTOR PROFILE IN YOUNG ADULT STROKE PATIENT OF TERTIARY CARE CENTRE OF NORTH BENGAL

General Medicine

Prajjal Kumar Sinha*	MD,DM, Senior Resident, Department of Cardiology, R.G Kar Medical College, Kolkata, India. *Corresponding Author
Shantasil Pain	MD, Professor, Department of General Medicine, Institute Of Post Graduate Medical Education And Research, Kolkata, India.
Biswajit Majumder	MD,DM,FACC, Associate Professor, Department of Cardiology, R.G Kar Medical College, Kolkata, India.
Amrita Saha	MBBS,MO, SNCU Medical Officer, Department of paediatrics, Dr B C Roy PGIPS, Kolkata, India.

ABSTRACT

This observational cross sectional study of 40 patients aged 20-40 years was to identify the different risk factors of young strokes in India in comparison to the Western world and other Asian countries, and thereby identify the necessary preventive measures so that the incidence of young stroke in India becomes lower than the current incidence. All the patients with history of head trauma and stroke mimickers were excluded. Since there is paucity of this type of study in Indian population and especially in our setup, it was quite interesting to see the incidence, etiology and subtype of young stroke in our population. The values were analysed using the Chi-Square test and correlation was done and Pearson's correlation coefficient was calculated between the variables.

In conclusion, significant positive correlations were found between young stroke and hypertension, Rheumatic heart disease, high serum creatinine, carotid artery Doppler study for intima-medial thickness and ECG abnormalities in the form of RVH and LVH.

KEYWORDS

Rheumatic heart disease, Intima-medial thickness, RVH, LVH

INTRODUCTION

Stroke is the third most common cause of death worldwide after coronary heart disease (CHD) and cancer of all types^{1,2}. However, unlike the Caucasians, Asians have a lower rate of CHD and a higher prevalence of stroke^{2,3}.

Stroke is one of the leading causes of morbidity and mortality. It is the acute manifestation of cerebrovascular disease. WHO defined stroke as 'rapidly developed clinical signs of focal disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than vascular origin'. The 24 hours threshold in the definition excludes transient ischemic attacks (TIA). The disturbance of cerebral function is caused by three morphological abnormalities:

- Stenosis
- Occlusion
- Rupture of the arteries

Dysfunction of the brain (neurological deficit) manifests itself by various neurological signs and symptoms that are related to the extent and site of the area involved and to the underlying causes. These include:

- Coma
- Hemiplegia
- Paraplegia
- Monoplegia
- Multiple cranial nerve paralysis, speech disturbances, sensory impairment, etc.

Hemiplegia constitutes the main neurological disorder in about 90% of the patients.

Stroke is a worldwide health problem. It makes an important contribution to morbidity, mortality and disability in developed as well as developing countries. Cerebral thrombosis is the most frequent form of stroke encountered in clinical studies, followed by hemorrhage. Subarachnoid hemorrhage and cerebral embolism come next as regards both morbidity and mortality⁶. Although the prevalence of stroke appears to be comparatively less in India than in developed countries, it is likely to increase proportionally with the increase in life expectancy^{6,9,10}. The proportion of strokes in the young is significantly more in India than in developed countries^{7,8}. Some of the more important causes for this are likely to be:

- Rheumatic heart disease
- Ischemic strokes in peripartum period

- Arteriopathies as a sequel of CNS infections like bacterial or tuberculous meningitis⁹.

A number of well-defined prevalence studies of stroke have been carried out on adequate sample size. These studies were carried out from 1980s to year 2001, and include studies from South India and eastern part of India¹¹ and North India. Meta-analysis of these studies yielded weighted average of prevalence rates as 1.54/1000¹¹. Inverse variance method of weighted average was used. Thus, larger studies having smaller standard errors, are given more weight than smaller studies, which have larger standard errors. This choice of weight minimizes the variability of the pooled estimate of prevalence rate. Age and sex wise distribution of cases and study population was available only from a few studies. This distribution has been given as required (for input in DISMOD analysis) in the latest available study. It may also be seen that the prevalence rate of stroke reported by this study (1.47 per thousand) is very close to the weighted average of prevalence rates of all other studies (1.54 per thousand)⁹. The MCCD data has tabulated deaths due to diseases of the nervous system into following categories:

- Meningitis
- Multiple sclerosis
- Epilepsy
- All other diseases of nervous system.

The deaths due to stroke are included among all other diseases of nervous system and these have not been tabulated separately. There were only a few surveys in India where the annual incidence rate (AIR) of stroke was determined. The AIR was 105/100,000 in the urban community of 19 and 262/100,000¹¹ in a rural community of West Bengal¹¹. However, all these AIR values were underestimates because only the stroke survivors, and not stroke death cases, were included. The AIR was age adjusted against the US population of 1990 and of 1996 and came out to be 22 and 19 respectively in rural and urban population¹¹. The age-adjusted AIR of stroke in the West was between 100-300/100,000^{8,13}. In mainland China, the age-adjusted incidence of first-ever stroke from a community survey of six cities in 1983 was 219/100,000 population, higher in the north than south from 441 to 136 per 100,000 population¹⁴. Thus, the limited data shows that the incidence of stroke in India falls within the range reported elsewhere.

Many studies have shown an increased prevalence of stroke in young (those less than 45 years old) in India ranging from 18.8% to 32% of all stroke cases with a male:female ratio of 1.1:1 corresponding figure in USA (person less than 30 years of age) and Japan are 2.8% and 7.6% respectively^{4,15}. The increased incidence has been attributed to:

- Cerebral embolism due to cardiovascular disease specially rheumatic heart disease
- Ischemic stroke related to pregnancy and puerperium
- Thrombosis of internal carotid arteries
- Lipid abnormalities
- Hematological condition like sickle cell disease, coagulation abnormalities
- Arteriopathies such as sequelae of CNS infection like intracranial tuberculous infection and meningovascular syphilis, Takayasu arteritis and Moya Moya disease^{16,17,18}.

AIMS AND OBJECTIVES

The aim of this epidemiological study was to identify the different risk factors of young strokes in India in comparison to the Western world and other Asian countries, and thereby identify the necessary preventive measures so that the incidence of young stroke in India becomes lower than the current incidence and to investigate the:

1. Demographic factors related to young stroke.
2. Other risk factors related to stroke in the young adults.

MATERIALS AND METHODS

This observational cross sectional study was conducted at North Bengal Medical College and Hospital, Darjeeling in the Department of General Medicine from June 2015 to May 2016. All the patients provided consent and the study protocol was approved by the Ethical committee of the Institution. 40 patients aged between 20-40 years were admitted to wards during the study period with stroke as per inclusion and exclusion criteria.

INCLUSION CRITERIA-

All patients aged 20-40 years were admitted to the wards during the period of 1 year with history suggesting of stroke and CT scan/MRI brain showing infarction or hemorrhage.

EXCLUSION CRITERIA-

All the patients with history of head trauma and stroke mimickers were excluded.

In our study significant positive correlations were found between young stroke and hypertension, Rheumatic heart disease, high serum creatinine, carotid artery Doppler study for intima-medial thickness and ECG abnormalities in the form of RVH and LVH.

Table 1: Distribution of study population according to gender (n=40)

Gender	Frequency	Percent
Male	22	55.0
Female	18	45.0
Total	40	100.0

In our study, there were 22 males (55%) and 18 females (45%) out of 40 study subjects.

Table 2: Distribution of study subjects according to age group (n=40)

Age group	Frequency	Percent
20-30 years	18	45.0
31-40 years	22	55.0
Total	40	100.0

In this study, among 40 patients 18 (45%) were within the age group 20-30 years and 22(55%) were within the age group 31-40 years.

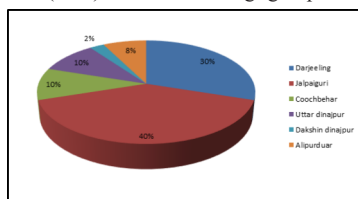


Figure 1: Distribution of cases according to geographic area

Table 3: Distribution of cases according to dyslipidemia status (n=40)

Dyslipidemia status	Frequency	Percent
Absent	32	80.0

Present	8	20.0
Total	40	100.0

In this study, 8 patients (20%) showed evidence of dyslipidemia (had high triglyceride level, high LDL level along with total cholesterol level along with low HDL level).

Table 4: Degrees of significance of various risk factors in the causation of stroke in young

Variable Risk Factors	p value
1. Gender Distribution	p=0.64
2. Age Distribution	p=0.46
3. Literacy Status	p=0.65
4. Obesity	p=0.72
5. Dyslipidemia	p=0.75
6. Diabetes Mellitus	p=0.44
7. Hypertension	p=0.002
8. Smoking	p=0.62
9. Alcohol consumption	p=0.40
10. Rheumatic Heart Disease	p=0.005
11. High blood Urea	p=0.20
12. High Serum Creatinine	p=0.020
13. CIMT	p=0.013
14. ECG Abnormalities	p=0.0002
15. Protein C/S deficiency	p=0.53
16. ANA & ANTI ds-DNA profile	p=0.98

p: Significance value

DISCUSSION

Our center is a tertiary center for neurological and medical diseases. Hence our study is likely to be biased for more disabling and complicated cases. It is expected that our data will be useful to identify the different risk factors of young strokes in India, and thereby identify the necessary preventive measures so that the incidence becomes lower than the current one. In similarity to studies from India and the west, males outnumbered females in our study. However, we got 55% male suffering from stroke which is keeping with various studies from the west (44.1% to 58.9%)¹⁹. Similar to reports from other countries, incidence rates for both men and women were found to rise steeply after the age of 31 years in this study²⁰.

In our study significant positive correlations were found between young stroke and hypertension, Rheumatic heart disease, high serum creatinine, carotid artery Doppler study for intima-medial thickness and ECG abnormalities in the form of RVH and LVH.

In our study, 10% patients were diabetic, 20% were suffering from dyslipidemia and 52.5% were smokers. However, none of these correlated significantly in the present study.

The association between alcohol and smoking in our study was not significant, but alcohol is a major risk factor in young adult stroke patients.

In our study population, hereditary deficiency of natural anticoagulant (Protein C, Protein S and antithrombin III deficiency) was encountered in 1 patient (Protein C/S deficiency).

Though the correlation of dyslipidemia was insignificant in my study, the atherogenic level of low density and high density lipoproteins (LDL/HDL) was present in (14.66-31 percent) of young adult patients.

LIMITATIONS OF THE STUDY

This cross sectional study looked at point prevalence of stroke in young. However, a prospective study will better reflect the consequence of risk factors on the incidence of stroke in this group of patients. We included all consecutive patients and possibly confounded our findings with co-morbidities like hypertension and hyperlipidemia. This study did not blind the lab technicians which could have incorporated errors from observer bias. Lastly, financial constraints deterred us from performing tests like procoagulant profiling of the patients.

CONCLUSION

We conclude from this study that:

1. Stroke in young is more prevalent among 31-40 years age group than among 21-30 years age group.

2. Males are more commonly affected with stroke in the age group 21 – 40 years.
3. The commonest etiology of stroke in young is Rheumatic heart disease.
4. Hypertension is significantly associated with stroke in young.
5. Carotid intima-medial thickness is increased in young patients with stroke.

So we conclude from our study that stroke in young adult is on the rise and there are multiple causative factors, if we can identify those risk factors at an early stage then the chances of recurrence of stroke might decrease in this group of patients.

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