

Study of Prevalence of Stroke in Young Indian Population: A Prospective Study

Dr. Shailendra Singh^{1*}, Dr. Chetan Mathur², Dr. Hritu Singh³, Dr. Shahid Abbas⁴

¹Senior Residence Medicine, Atal Bihari Vajpayee Government Medical College, Vidisha, Madhya Pradesh, India

²Senior Residence Medicine, Sri Aurobindo Institute of Medical Sciences & PGI, Indore, Madhya Pradesh, India

³Associate Professor Psychiatry, RKDF Medical College, Bhopal, Madhya Pradesh, India

⁴Professor, MD Medicine, Sri Aurobindo Institute of Medical Sciences & PGI, Indore, Madhya Pradesh, India

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*Corresponding author: Dr. Shailendra Singh

Abstract

Original Research Article

Background: Stroke in young poses a major health problem. Stroke in young has special significance in developing countries. **Aims and Objective:** To study the prevalence of stroke in young and compare with the normal population. **Materials and Methods:** Ninety subjects were studied in the Department of General Medicine at Sri Aurobindo Medical College and PGI, Indore (M. P.) for one and half year from June-2015 to March-2016 after dividing them in to Cases (n=45; patient who had ischemic stroke screened through CT/MRI findings) and Control (n=45; normal individuals who had no documented heart disease). Clinical information including age and sex were obtained and all the subjects were divided based on different age groups and the prevalence was recorded. **Results:** Out of a population of ninety, more than half (56, 62.2%) of the subject was male while rest (34, 37.8%) was female. The age of all cases and controls found to be in the ranges from 15 to 45 years. The mean age (mean \pm SD) of all samples (N=90) was 36.53 ± 7.53 years. The scatter of mean age for the case group (n₁=45) was 36.80 ± 7.90 years and found within ranges from 15 to 45 years while for controls (n₂=45) was 36.27 ± 7.22 years had ranges from 20 to 45 years. **Conclusion:** Stroke in young in present study is high. Preventive measures could aid immensely in bringing down costs and emotional burden on the family.

Keywords: stroke in young, complications, cerebrovascular disease, developing regions.

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INTRODUCTION

Globally, cerebrovascular disease (stroke) is the second leading cause of death. It is a disease that predominantly occurs in mid-age and older adults. Previous authors have proved that stroke is of epidemic proportion in India and young age stroke constitutes an emerging trend. By 2050, it is anticipated that 80% of stroke events will occur in people living in developing regions of the world [1, 2].

A previous study from Kolkata, studied a sample consisting of mainly younger people (>80% were aged <60 years) who are active in the workforce [3]. Other Indian studies have shown that about 10% to 15% of strokes occur in people below the age of 40 years [4]. It is believed that the average age of patients with stroke in developing countries is 15 years younger than that in developed countries [5, 6].

There is no study estimating the prevalence of stroke in young at our centre. Hence in present study we

tried to evaluate the prevalence of stroke among the young population who are visiting our centre.

MATERIALS AND METHODS

Present case-control study was performed in the Department of General Medicine at Sri Aurobindo Medical College and PGI, Indore (M. P.) for one and half year from June-2015 to March-2016.

Non-probability sampling technique used to recruit the desired samples from the target population. Samples had chosen by using purposive sampling technique that met inclusion-exclusion criterion.

Patients with first ever episodes of ischemic stroke presenting within two weeks of the event having age between 15 years to 45 years and those willing to give informed consent were included in the present study. Patients with non-hemorrhagic stroke, renal, hepatic thyroid dysfunction, collagen vascular diseases, chronic inflammatory diseases like HIV, syphilis,

tuberculosis, cancer, patient on steroids and anticonvulsants, pregnancy state and Postpartum period and patients with rheumatic heart disease were excluded from the present study.

Patient who had ischemic stroke screened through CT/MRI findings and the normal individuals who had no documented heart disease further met the inclusion criteria selected as subjects during specified schedule. A maximum of ninety, patients and normal individuals purposively chosen and divided equally into two groups of equal size of 45.

Forty five cases of ischemic stroke visited/admitted at study center with weakness of limb, and a rise in serum biomarkers of stroke included as subjects in case group while forty five individuals had no documented stroke served as subjects in control group for this study. Controls recruited from hospital staff or individuals who accompany patients referred to the hospital.

The patient and controls had explained about the complete study in his/her own language and his/her willingness to participate had recorded in a consent form dually signed by him/her. Observations on selected parameters for two groups recorded.

Clinical information including age and sex were obtained and all the subjects were divided based on different age groups and the prevalence was recorded.

STATISTICAL ANALYSIS

The analysis of the gathered data done by using both descriptive and inferential statistics based on the predetermined objectives of the study. Results on continuous measurements presented on Mean \pm SD (Min-Max) while the results on categorical measurements presented in numbers or percentage. The age and sex had noted for ischemic stroke patients and control individuals in two groups: case group and control group. A comparison of mean age between both the groups was performed using independent sample t-test. The probability value from $p < 0.05$ to $p < 0.02$ was considered as statistically significant while from $p < 0.01$ to $p < 0.0001$ was considered as statistically highly/strongly significant.

RESULTS

Out of a maximum of 90 samples ($n=90$), forty-five were the cases of ischemic stroke while rest forty five were the normal individuals had no documented heart disease chosen purposively as subjects for the present study.

Subjects distributed into two groups of equal size and for further statistical analysis treated as case group ($n_1=45$) and control group ($n_2=45$). Out of a population of ninety, more than half (56, 62.2%) of the subject was male while rest (34, 37.8%) was female.

The age of all cases and controls found to be in the ranges from 15 to 45 years. The mean age (mean \pm SD) of all samples ($N=90$) was 36.53 ± 7.53 years. The scatter of mean age for the case group ($n_1=45$) was 36.80 ± 7.90 years and found within ranges from 15 to 45 years while for controls ($n_2=45$) was 36.27 ± 7.22 years had ranges from 20 to 45 years.

Table-1: The frequency and percentage distribution of age in groups

Age (year)	Case group		Control group	
	No of patients	Percentage	No of subjects	Percentage
15-25	3	6.7	5	11.1
26-35	15	33.3	12	26.7
36-45	27	60.0	28	62.2
Total	45	100.0	45	100.0

The distribution of age in case group found to be little similar when compared to control group which can be easily seen in table 1.

Table-2: The frequency and percentage distribution of gender in groups

Gender	Case group		Control group	
	No of patients	Percentage	No of subjects	Percentage
Male	30	66.7	26	57.8
Female	15	33.3	19	42.2
Total	45	100.0	45	100.0

The distribution of sex of subjects depicts in table 2 was found with little variation in groups.

Table-3: Comparison of age at the time of admission between cases and controls

Group	Age (year)	95% CI of the Mean Difference		z-value	P value
		LB	UB		
Case (n=45)	36.80±7.90	-2.66	3.69	0.32	>0.05
Control (n=45)	36.29±7.25				
Mean Difference	0.51 year*				

*The mean difference is not significant (insignificant) at the 0.05 level of significance. [Degrees of freedom is 88; UB-Upper Bound; LB-Lower Bound; LOS-Level of Significance]

Table 3 highlights that the distribution of ages of patients had ischemic stroke included as case and normal individual as control were same at the time of admission as the differences in mean age were not statistically significant. Result indicated the removal of biasness in the study regarding the distribution of age of the subjects was noted similar for the two groups.

DISCUSSION

The issue of stroke in young has been of considerable interest to neurologists in our country [7]. To define an age cut-off is challenging and sometimes arbitrary, but previously published studies and registries commonly define young adults as those younger than 45 or 49 years [8].

The age group for stroke in young has been variable between different studies but perhaps should be restricted to 15 to 45 years as this age group tends to have unique set of causes and risk factors [9]. There is no evidence indicating higher incidence of young stroke in India than in other countries.

Stroke is not an uncommon event in young adults [ages 15 to 45 years], accounting for an estimated 3 percent of cerebral infarctions in many series [10]. Table 1 projects that more than half of the patients (60.0%) and controls (62.2%) of case group and control group found more frequently in the age group of 36-45 years and followed by 33.3% stroke patients and 26.7% controls noted within age group of 26-35 years. Few patients (6.7%) of case group and few controls (11.1%) of control group noted within lower age group of 15-25 years.

Though the traditional risk factors of strokes plays a significant role in young age group also, presence of higher number of cryptogenic strokes, cardio embolic and venous strokes makes diagnostic evaluation in this age group more challenging/Stroke is a major public health problem. It is the most common neurological condition causing long term disability and has enormous emotional and socioeconomic consequences in patients, their families and health services [11].

Interestingly, the Kolkata study sample consisted of mainly younger people (>80% were aged <60 years) who are active in the workforce. When stroke occurs in the main income earner in the household, there may be enormous consequences for

the welfare of the family [4] which is in line with the present study findings.

Indian studies have shown that about 10% to 15% of strokes occur in people below the age of 40 years [5]. It is believed that the average age of patients with stroke in developing countries is 15 years younger than that in developed countries [12]. In present study mean age of cases (36.80±7.90 years) was found to be approximately similar as compared to controls (36.29±7.25 years) and hence the little age differences in groups couldn't satisfy the limit of statistical significance ($p>0.05$). Moreover, the statistical agreement indicated that the distribution of ages of case and control were noted similar at the time of admission for present study.

In India, nearly one-fifth of patients with first ever strokes admitted to hospitals are aged <40 years [11]. Globally, stroke is the third commonest cause of mortality [13] and the fourth leading cause of disease burden [14]. It makes an important contribution to morbidity, mortality, and disability in developed as well as developing countries.

However, the incidence of stroke increases dramatically with advancing age and increasing age is the most powerful risk factor for stroke. The incidence of stroke doubles each decade past 55 years of age. Half of all strokes occur in people older than 70 to 75 years.

Men develop ischemic stroke at higher rate than women up to the age of 75 years [15]. In agreement to this in present study more than two-third of the patients (66.7%) and more than half of the controls (57.8%) in case group and control group were more frequently male. Rest one-third of the patients (33.3%) and controls (42.2%) were female reported in case and control groups and were analyzed for the present study.

CONCLUSION

Age wise segregation of cases in stroke is important due to several reasons. Age has been shown to have a strong association with the incidence of stroke. While the peak age of stroke occurrence is 55–65 years, events occurring at a younger age as seen in present study assume importance in being occurring in a productive age group and having a different set of causes which have to be looked into apart from the conventional one.

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