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Original Research Article

Risk factors, etiology and prognostic markers in patients of young stroke: a prospective observational study

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ABSTRACT

Background: The rate of stroke at a young age has accelerated over the years and is a matter of true concern. Young stroke causes devastating consequences leading to loss of productive years and life time disability.
Methods: We performed an observational prospective study to identify the risk factors, etiology and prognostic markers in patients of young stroke.
Results: The study was conducted on 50 patients who were less than or equal to 50 years and have suffered ischemic stroke during the time period of 6 months i.e. from April, 2022 to September, 2022 and visited Department of Neurology, at SSB heart and multispecialty hospital, Faridabad. We found the prevalence of young stroke was significantly more in males (81%) compared to same aged female participants.
Conclusions: Maximum patients suffered young stroke were at an age group 35-45 years. We could identify that the traditional risk factors including diabetes, hypertension and dyslipidemia were the major risk factors compared to the lifestyle based risk factors like smoking or alcohol consumption. The young patients showed similar response to thrombolysis treatment like old stroke patients. All the patients enrolled in the study were cured. Further research is required to understand the risk factors and prognosis of young stroke.

Keywords: Complete blood count, Renal function test, Two-dimensional echocardiography

INTRODUCTION

Incidence of ischemic stroke in the young age has increased considerably in last decade.[1-3] Stroke occurring at an age less than 45 years is termed as young stroke. Though old age is a common risk factor for stroke but young stroke is not uncommon in the community. It has been reported that in Indian scenario, approximately 10%-30% of all stroke patients are young adults; whereas the percentage is 3%-8.5% in Western countries.[4-7] Another report by US National Survey of Stroke claims that a study done in 1981 showed only 3.7% of all stroke patients were in the age group of 18-45 years.[8-9] Interestingly, another study in 1990 has shown that the percentage has increased to 8.5% and further increased to 10% since 2000.[8,10-12] Recently the percentage of young stroke among all stroke patients has reached almost 20%.[13,14] Stroke in young can be really devastating in terms of loss of productive years and impact on a young person's life. Moreover a young stroke can cause lifetime disability and causes disastrous effect on the young working individuals.[15,16] Previous studies have reported that about 60% of young stroke survivors were disabled as a consequence of the stroke and any were unable to return to the society immediately.[17] Therefore it is indispensible to study the factors responsible for stroke and the prognostic markers which can prevent stroke in such young age. But early diagnosis remains challenging

because of the lack of awareness. Additionally, the causes of stroke in young are heterogeneous and can be relatively uncommon, resulting in uncertainties about diagnostic evaluation. Recently studies conducted in Europe and United States have reported that the risk factors for stroke which are common in older adult such as dyslipidemia, obesity, use of tobacco, diabetes and hypertension can also serve as risk factors for stroke in younger adults.[18-22] Further studies have also mentioned involvement of comorbid cardiovascular disease risk factors in young individuals and post stroke mortality.[18-23]

Aim of this study was to study the risk factors, etiology and prognostic markers of stroke in young patients.

METHODS

We conducted a prospective observational study at the Department of Neurology at SSB heart and multispecialty hospital, Faridabad after approval from SSB Institutional ethics committee. Total 50 participants were enrolled for the study. All participants were within an age limit of 50 years who have suffered ischemic stroke between a period of 6 months i.e. from April, 2022 to September, 2022. The patients with stroke mimics were excluded from the study. All the participants enrolled for the study underwent routine biochemistry (renal function test, liver function test, blood glucose and serum electrolytes), hematology (complete blood count) and coagulation profile tests. Further investigations performed by the treating neurologist included magnetic resonance imaging (MRI)-brain, MR angiography, two-dimensional echocardiography (2D-Echo), Holter monitoring and tests for collagen vascular disease.

The participants were divided into 4 cohorts based on their age group for easy etiological analysis. The 4 cohorts were <25 years, 25-35 years, 35-45 years and 45-50 years. Further the patients were also studied based on their gender. hypertension (HTN), DM, smoking, alcohol consumption (ALC), cardiomyopathy (CAD), TIA, PAD and dyslipidemia were considered as risk factors. Thrombolysis treatment was done by the treating neurologist as per the requirement.

RESULTS

The epidemiological factors like age and gender of the participants were studied in relation to young stroke. It was found out that the maximum prevalence (60%) was in the age group 35-45 years followed by 26% in 45-50 years group. The minimum incidence of young stroke was 4% in the age group below 25 years (Figure 1).

Considering the gender, 81% males were affected thus indicating a gender predilection in young stroke (Table 1).

Several risk factors were studied. Dyslipidemia was found in 88% while hypertension and diabetes accounted for 52% and 32% respectively. 28% had TIAs and 20% were smokers. CAD was found in 16% and 6% were alcoholic (Figure 2).

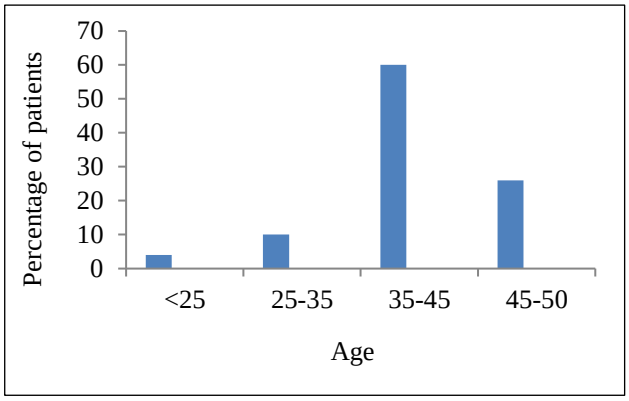

Figure 1: Percentage of patients suffered young stroke according to age group.

Table 1: Table describes total numbers and corresponding percentage of participants divided according to gender.

Gender	Total no. of patients	Percentage (%)
Male	35	70
Female	15	30

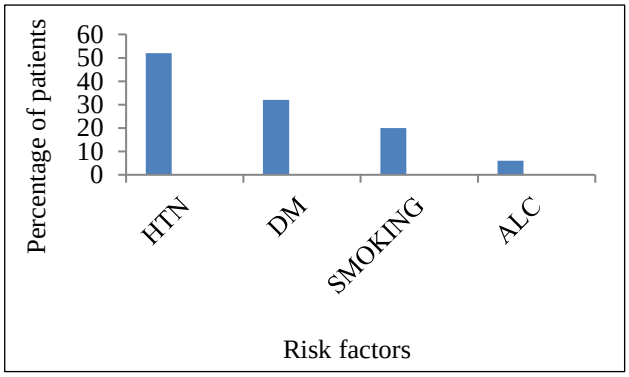

Figure 2: Percentage of patients with risk factors for young stroke.

The yield of several diagnostic tests was investigated in this prospective observational study. The yield was relatively low for Holter monitoring (6%), and collagen vascular disease screening (4%), hypercoagulability (4%) and moderate for 2D echo (16%) and cerebral angiography (10%). The clinical significance and treatment implications of findings such as a positive hypercoagulable panel test result, or a PFO on 2D echo remain controversial. Nevertheless, in view of the variable yield and high cost of specialized tests, it seems justified to routinely perform high yield tests such as hypercoagulability profile and vascular imaging in young stroke patients. The percentage of participants receiving positive findings from the investigations is described in Figure 3.

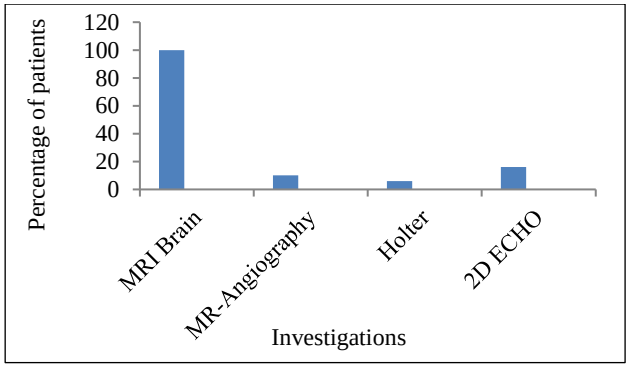

Figure 3: Percentage of patients with positive findings with various investigations for young stroke.

The treatment strategy in young stroke is similar to that followed in old strokes. If inside the window period of 4.5 hrs, the patient is thrombolysed. 64% of our patients were thrombolysed and the rest received the other conservative form of treatment (Table 2). There was no mortality among the studied patients (Table 3). More research is warranted to determine the cost-effectiveness of diagnostic tests and design appropriate strategies to evaluate stroke in the young.

Table 2: Table describes the numbers and correspondingly the percentage of patients undergoing thrombolysis treatment.

Treatment of thrombolysis	Total no. of patients	Percentage (%)
Thrombolysis treatment done	32	64
Thrombolysis treatment not done	18	36

Table 3: Numbers and correspondingly the percentage of patients who got cured in the observational study.

Mortality	Total no. of patients	Percentage (%)
No. of patients cured	50	100
No. of mortality	0	0

DISCUSSION

In this observational study, we found 70% of patients suffering young stroke were male. This study finding was consistent with reports from numerous studies on stroke in young patients.[1,8,24-27] One of the probable reasons for this might be a deviation in sex ratio and another might be the difference in exposure to risk factors. Previous studies have shown that there is much difference in the health behavior between male and female. Young males are more exposed to risk factors of stroke like alcohol consumption, cigarette smoking and hypertension compared to same aged female.[26] In addition to this, Kang et al have reported that the trend of obesity was found to be higher in men in the age group of 40 or less compared to women of same age.[28] The findings of our observational prospective study illustrate that dyslipidemia, hypertension and diabetics are the major risk factors contributing to young stroke. This gives an idea that the predictors, risk factors, treatment and prognosis of young stroke don't vary significantly as compared to old stroke. Moreover the life style related risk factors such as alcohol consumption and cigarette smoking also contributes to young stroke though in less numbers. This finding is contradictory to Bailey et al, Sarnowski et al and The Helsinki young stroke registry study which all have reported that lifestyle related risk factors play dominate role in young stroke compared to traditional factors responsible for old stroke.[29-31] This might be due to the change in trend of awareness against alcohol consumption and cigarette smoking but on the other hand increase in physical and emotional stress leading to the development of traditional factors like dyslipidemia, hypertension and diabetics in young adults. The uncommon factors are hypercoagulability and collagen vascular diseases, which need thorough workup. More research is needed on the diagnostic techniques including Holter, hyper coagulability and monitoring for collagen vascular diseases which showed low yield in our study. Regarding the treatment strategy, it can be concluded that the patients of young stroke respond equally well to thrombolysis as compared to old stroke.

His study has few limitations. It was a single center study with less sample size with study with more objectives should be planned.

CONCLUSION

This is a small observational study pointing towards the etiology and treatment of young stroke but further research on a larger scale is warranted for further prognostication and better understanding of young stroke.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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