

Homocysteine Level In Young Stroke

Gaurav Pandey¹, Saurabh Singhal²

¹(Medicine Department, Subharti Medical College/ Subharti University, Meerut, India)

²(Medicine Department, Subharti Medical College/ Subharti University, Meerut, India)

Corresponding Author: Gaurav Pandey

Abstract: There is a significant positive correlation being observed between homocysteinemia in stroke among young adults with age group between 18 - 45 years. Hyperhomocysteinemia is one of the modifiable risk factor among causes of ischemic stroke in young. All young patients with ischemic stroke need to be investigated for homocysteine level, and treatment of hyperhomocysteinemia may help in preventing recurrence of ischemic stroke. Patients with ischemic stroke who were 18 – 45 years of age, were enrolled in this study. Patients with the age group between 30-35 years showed homocysteine level of 21.26 mmol/litre and those with the age group between 36-40 years showed homocysteine level of 17.28 mmol/litre and those with the age group between 41-45 years showed homocysteine level of 18.0 mmol/litre.

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I. Introduction

Stroke remains a major cause of mortality and morbidity worldwide.¹ The burden of stroke arises largely from the elderly population. However, there remains a small but significant subset of younger patients with ischemic stroke, in whom conventional vascular risk factors play a smaller role.

Homocysteine(hcy) is a sulfhydryl-containing amino acid derived from the essential amino acid, methionine which is abundant in animal sources of protein, total Homocysteine plasma level varies in the range of 5-15 mol/lit in the normal population. Minor genetic abnormalities or nutritional deficiencies of B vitamins, and folic acid involved in methionine metabolism, can lead to increased homocysteine concentration.

Ischemic stroke is a heterogeneous syndrome caused by multiple disease mechanisms, resulting in a disruption of cerebral blood flow with subsequent tissue damage. The extent of focal cerebral injury is influenced by different molecular mechanisms. An alteration of the physiological balance between production and degradation of enzymatic activity involved in the regulation of tissue oxidative status may play a role in influencing the results of the ischemic condition.²

The involvement of homocysteine in atherosclerosis was first seen by McCully on the basis of his pathological findings in infants with hyperhomocysteinemia resulting from inborn metabolism deficiency. There is growing evidence that high homocysteine levels contribute to the pathogenesis of ischemic stroke. Homocysteine is believed to cause atherogenesis and thrombogenesis via endothelial damage, vascular smooth muscle proliferation, and coagulation abnormalities. High homocysteine levels are associated with increased risk of cardiovascular and cerebrovascular disease.³

Dutta et al studied 42 cases of cerebrovascular accidents over a period of one year. It was observed that serum homocysteine levels were significantly raised in those with intracerebral infarcts when compared with intracerebral hemorrhage.⁴

Kristensen et al in a case control study of 80 consecutive patients aged 18-44 years with first ever ischemic stroke and 41 healthy control subjects showed that moderate increase in homocysteine levels associated with an increased risk for ischemic stroke in young adults.⁵

II. Material And Methods

This prospective study was conducted in Department of Medicine at Subharti medical college, Meerut, Uttar Pradesh. The study was conducted for a duration of 2 years (1/1/16 – 1/1/18). A total of 50 cases (both male and females) of age between 18 – 45 years were included in this study.

Study Design: Prospective study.

Study Location: This was a tertiary care teaching hospital based study done in Department of General Medicine, at Subharti medical college, Meerut, Uttar Pradesh.

Study Duration: January 2016 to January 2018.

Sample Size: 50 patients.

Study Population : All cases of young ischemic stroke age between 18 – 45 years were included in this study attending the Post Graduate Department of Medicine, Subharti Medical College.

Inclusion criteria:

1. Cerebrovascular accident (Ischemic stroke) diagnosed clinically and after brain imaging.
2. Patients age 18 - 45Years.

Exclusion criteria:

1. Patient with head trauma.
2. Age 18- 45years.
3. History of previous cerebrovascular accident, ischemic heart disease, peripheral vascular disease, hypothyroidism, chronic kidney disease.
4. Pregnant female.
5. Consumption of oral contraceptive pills.

Procedure methodology

Patients with ischemic stroke who were 18 – 45 years of age were enrolled in the study who had a score greater than 4 on the National Institutes of Health Stroke Scale (NIHSS; a 42-point scale that quantifies neurologic deficits in 11 categories, with higher scores indicating more severe deficits), and a pre-morbid score of 2 or less on the modified Rankin scale (which ranges from 0 to 6, with 0 indicating no symptoms and 6 indicating death). Physicians have been also trained to the assessment of neurological status by calculating the NIHSS score. This score counts 15 items that measure the depth of the neurological deficit quoted from 0 to 42, <5 it reflects a minor deficit and > 25 severe neurological impairment. In consultation with the medical imaging department, access to MRI was facilitated during the day and to the CT scan during the night.

The family consent, after discussion of the benefit and complications of this study was obtained for each patient who could not give it themselves. The collected variables were the time of onset of symptoms, the time of arrival to the emergency room, demographic data, risk factors for ischemic stroke, a detailed neurological examination with calculation of the NIHSS score, monitoring of systolic and diastolic blood pressure and blood glucose. Homocysteine level in young stroke and its co-relation with occurrence of stroke in young patients was assessed.

Statistical analysis

All the collected data was entered in Microsoft Excel sheet and then transferred to SPSS software ver. 17 for analysis. Qualitative data was presented as frequency and percentages and analysed using chi-square test. Quantitative data was presented as mean and SD. Correlation between variables was done by using Pearson's correlation test. P-value < 0.05 was taken as level of significance.

III. Result

This study was a prospective study done with the aim to estimate homocysteine level in stroke among young adults with age group between 18 - 45 years. The study sample comprised of 50 patients.

Table no 1. Comparison of age group with gender amongst study population

			Sex		Total
			Female	Male	
Age group	30 to 35 yrs	Count	1	8	9
		%	8.30%	21.10%	18.00%
	36 to 40 yrs	Count	5	14	19
		%	41.70%	36.80%	38.00%
	41 to 45 yrs	Count	6	16	22
		%	50.00%	42.10%	44.00%
Total		Count	12	38	50
		%	100.00%	100.00%	100.00%

As seen in the table no.1, 41 to 45 years of age was observed in 50% of female and 42.10% of male, 36 to 40 years of age was observed in 41.70% of female and 36.80% of male and 30 to 35 years of age was observed in 8.30% of female and 21.10% of male and this difference was statistically insignificant (P value – 0.605).

Graphical representation of comparison of age group with gender amongst study population

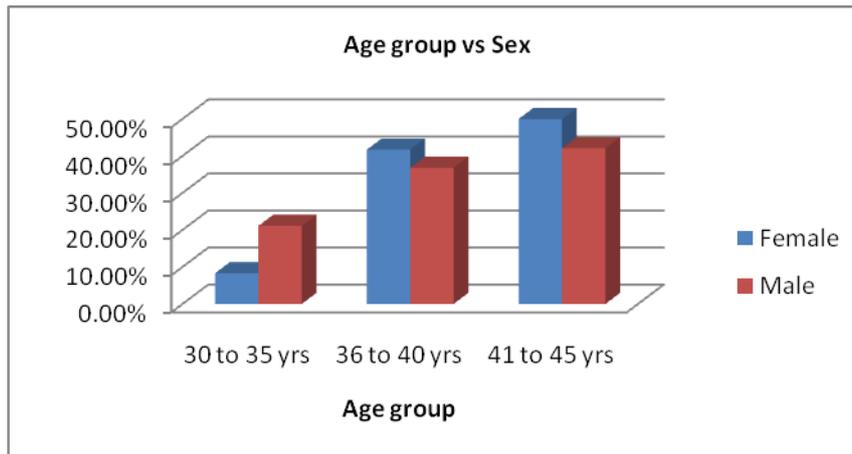


Table no 2. NIHSS Grade amongst study population

NIHSS GRADE	Frequency	Percent
Mild stroke	14	28.0
Moderate stroke	27	54.0
Moderate to severe stroke	9	18.0
Total	50	100.0

As seen in the table no.2, Moderate stroke (54%) was the most common NIHSS Grade amongst study population followed by Mild stroke (28%) and Moderate to severe stroke (18%).

Graphical representation NIHSS Grade amongst study population

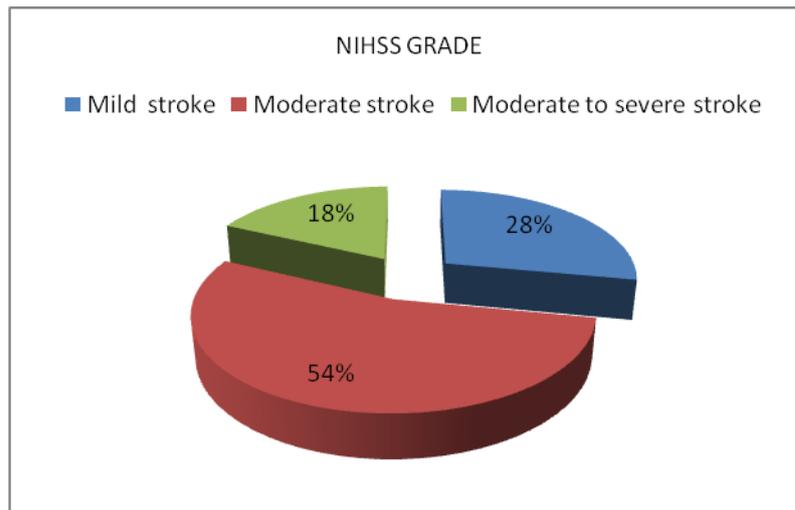


Table no 3. Comparison of Homocysteine levels with age amongst study population

AGE GROUP	HOMOCYSTEINE LEVEL(mmol/litre)
30-35 Years	21.26
36-40 Years	17.28
41-45 Years	18.0

Table no. 3 shows that patients with the age group between 30-35 years showed homocysteine level of 21.26 mmol/litre and those with the age group between 36-40 years showed homocysteine level of 17.28 mmol/litre and those with the age group between 41-45 years showed homocysteine level of 18.0 mmol/litre.

IV. Discussion

In the present study, 41 to 45 yrs (44%) was the most common age group amongst study population followed by 36 to 40 yrs (38%) and 30 to 35 yrs (18%) with the Mean age was 38.09 ± 4.1 years. This findings correlate well with the study conducted by Gajbhare PT et al. in which the mean age was 39.09 ± 5.2 years and most subjects were from age group between 25 to 45 years.⁸ Similarly study done by Datta S, Pal SK, Mazumdar H, et al. also showed that the incidence of stroke in patients <45 yrs of age was high in India that is 18-32% as compared to other countries.⁶

In the present study, there was male predominance (76%) amongst study population as compared to female (24%). Similarly in the Framingham heart study group 2005 showed that the incidence of stroke is higher in men than in women in all age classes, and women are, on average, several years older than men when they suffer their first stroke. The prevalence of stroke was higher among men up to the age of approximately 80 years, after which it became higher in women.⁷

In the present study, Moderate stroke (54%) was the most common NIHSS Grade amongst study population followed by Mild stroke (28%) and Moderate to severe stroke (18%).

In the present study, there was a significant positive correlation observed between age and serum Homocysteine level amongst study population. However, according to findings of Longo et al and Zongte et al increase in the serum homocysteine levels were observed with increasing age.⁸

V. Conclusion

There was a significant positive correlation was observed between homocysteinemia in stroke among young adults with age group between 18 - 45 years. Hyperhomocysteinemia is one of the modifiable risk factor among causes of ischemic stroke in young. All young patients with ischemic stroke need to be investigated for homocysteine level, and treatment of hyperhomocysteinemia may help in preventing recurrence of ischemic stroke.

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