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Homocysteinemia in Ischemic Stroke among Young Adults

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Abstract: ***Background and Objectives:*** *Cerebrovascular disease is the most common life threatening neurological disease and is a concern in young patients especially in developing countries. This study aims to identify homocysteinemia in patients presented with ischemic stroke between the ages of 15-45 years.* ***Methodology:*** *38 patients were included in the study. Routine investigations, homocysteine levels, and CT/MRI Brain were done for all the patients. Result: Among 38 patients studied homocysteinemia was seen in 4 patients.* ***Interpretation & Conclusion:*** *Homocysteinemia is one of the modifiable risk factor for ischemic stroke in young patients.*

Keywords: Cerebrovascular disease; ischemic stroke; homocysteinemia; young adults;

1. Introduction

Stroke was defined by World Health Organization criteria as rapidly developing clinical signs of focal, at times; global disturbance of cerebral function lasting for more than 24 hours or leading to death with no apparent cause other than vascular origin.[1]Stroke is one of the most important causes of high morbidity and mortality all over the world. The diseases of cerebral blood vessels and the related infarcts and hemorrhages, though principally occur in the elderly, the young are not spared.[1] The latest available estimates from Indian Council of Medical Research (ICMR) indicate that in 2004 there were 930,985 cases of stroke in India with 639,455 deaths and 6.4 million disability adjusted life years (DALY) lost.[2] Although various studies on stroke in young included subjects from second to fourth or fifth decade, in general, stroke in young includes subjects falling under the age group of 15-45 years.[3]

The aetiology may vary with different age groups. Though the traditional risk factors of stroke play a significant role in young age group also, the presence of risk factors in young patients seems to be increasing recently, and having those risk factors under control is essential to decrease the burden of stroke especially in young adults. Under such circumstances, primary prevention has to be emphasized to prevent the occurrence of strokes, which can be accomplished by monitoring the risk factors.[2] Stroke affecting the young has potentially devastating consequences on the individual, his family and the society in general. Several studies have analyzed the risk factors of stroke in young, but considering its impact on younger generation, more studies are needed for identification and analysis of risk factors. Homocysteine is generally considered to cause vascular injury, arteriosclerosis, and thrombosis. Hyperhomocysteinemia has been identified to be strongly associated with stroke in young.[4, 5]

2. Methodology

2.1 Study Design

A Cross sectional, descriptive and clinical study

2.2 Source of Data

Patients diagnosed to have Ischemic stroke in young admitted to Adichunchanagiri Institute of Medical Sciences, B G Nagar, Department of medicine from June 2013 to July 2014 and fulfilled the inclusion and exclusion criteria.

2.2.1 Inclusion Criteria:
1. Age 15 - 45 years.
2. Patients with abrupt onset of focal or global neurological deficit attributable to Ischemic cause and persisting for more than 24 hours.

2.2.2 Exclusion Criteria:
1. Neurological Deficit attributable to other than ischemic cause.

2.3 Method of Collection of Data:

All patients who fulfilled the inclusion and exclusion criteria were included in this study. A Proforma was prepared which included detailed history and clinical examination. Relevant investigations like hemoglobin, total white cell count, erythrocyte sedimentation rate, urine routine , blood glucose, blood urea, serum creatinine, VDRL, serum lipid profile, bleeding time, clotting time, HIV, Homocystiene, , CT scan brain/MRI brain, were done for all patients,

2.4 Statistical Methods

The statistical parameters used were the continuous variable such as age was expressed in terms of average ± standard deviation. The statistical significance of an observation was determined by calculation of p value using chi-square test or Fisher's exact test as relevant. A p value of <0.05 was taken as statistically significant.

3. Result

The patients admitted with ischemic stroke between age group of 15 to 45 years to our hospital were taken for study.

Table 1: Age and Sex Distribution

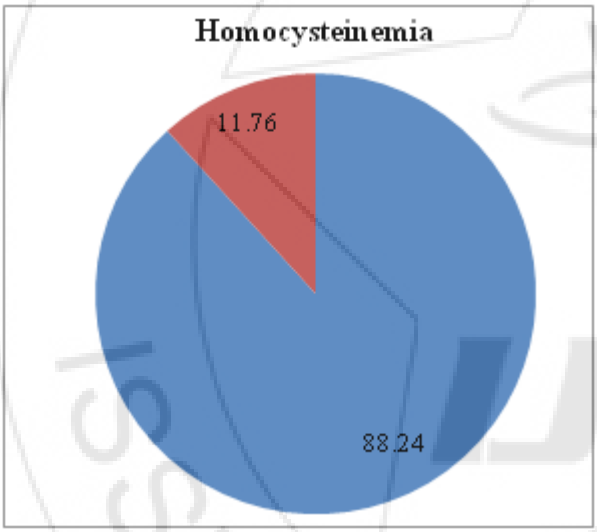
Age groups	Male	Female	Total	%
<20yrs	1	2	3	8.00
21-25yrs	2	5	7	18.4
26-30yrs	3	4	7	18.4
31-35yrs	5	2	7	18.4
36-40yrs	6	3	9	23.7
41-45yrs	3	2	5	13.1
Total	20	18	38	100.00

A total of 38 patients, 20 males and 18 females diagnosed to have ischemic stroke in young were included in the study. The maximum number of ischemic stroke in males occurred in the age group of 36 to 40 years, where as in females it was in the age group between 21-25years. Overall majority of ischemic stroke cases were in age group of 36-40 years.

Table 2: Homocysteine associated with ischemic stroke

Homocysteine	No of cases	% of cases
Elevated	4	11.76
Normal	34	88.24
Total	38	100.00

Homocysteine was elevated in 4(11.76%) of patients with ischemic stroke in young.



4. Discussion

Present study included ischemic stroke patients between 15-45 years. Sex ratio in our study was 1.11:1 (male: female). Mehndiratta M M et al[6] showed a ratio of 1.08:1 in north India where as Zunni et al[7] demonstrated a similar ratio of 1.2:1.

In this study, we found a strong correlation of hyperhomocysteinemia with ischemic stroke in younger age group. The results of the present study are consistent with many studies involving patients of all age groups.

Study by Bo Kristensen, Jan Malm, Torbjörn K. Nilsson, Johan Hultdin, Bo Carlberg, et al, on 80 patients aged 18 to 44 years admitted as a result of a first-ever ischemic stroke, after adjustment for conventional risk factors, elevated homocysteine levels were associated with a 4.8-fold increased risk of ischemic stroke.[8] Weili ZHANG, Kai SUN, Jinxing CHEN, Yuhua LIAO, Qin QIN, Aiqun MA, et al, studied a total of 347 recurrent strokes and 323 deaths from all causes. After adjustment for age, gender and conventional vascular risk factors, the plasma homocysteine concentration was associated with an increased risk of 1.74-fold for stroke recurrence and 1.75-fold for all-cause mortality.[9] Ralph L. Sacco, Kishlay Anand, Hye-Seung Lee, Bernadette Boden-Albala, Sally Stabler, et al, study confirms that elevated homocysteine is a risk factor for ischemic stroke and combined vascular events; For ischemic stroke, the Hazard Ratio for homocysteine levels <10 micromol/L were 1; the hazard increased only slightly for 10 to 15 micromol/L, and almost doubled for >15 micromol/L.[10] Homocysteine was a strong and independent risk factor for ischemic stroke, and after adjustment for age, sex, conventional vascular risk factors, and history of previous vascular events, the adjusted OR was 2.2 .[11, 12]

5. Conclusion

Our study done on homocysteinemia in ischemic stroke among young adults with age group between 15-45 years found hyperhomocysteinemia in 11.76% of ischemic stroke patients. 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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