

Raised Homocysteine Level in Ischemic Stroke

Muhammad Saad ur Rehman, Saqib Nadeem, Bushra Kokab

ABSTRACT

Objectives: To determine the frequency of raised homocysteine level in ischemic stroke. **Methodology:** This was a cross sectional study. This was carried out at Department of Medicine, Shaikh Zayed Hospital, Lahore during March 2016 to November 2016. The 100 cases of either gender falling in the age range of 40-80 years were included. ischemic infarct was labeled on the basis of hypodense area on CT brain. Raised homocysteine level was labeled when the levels were more than 15 $\mu\text{mol/L}$. **Results:** In the present study there were total 100 cases of ischemic stroke, there were 60 (60%) males and 40 (40%) females. The mean age of the cases was 52.34 ± 6.57 years. Raised homocysteine levels was seen in 60 (60%) of the cases. It was seen more in females affecting 24 (63.15%) cases with $p= 0.48$. It was near significantly high in age group 60-80 years where it was seen in 34 (65.38%) of cases with $p= 0.09$. **Conclusion:** Ischemic stroke is one of the fatal complication of raised homocysteine levels and it is near significantly associated with higher age.

Key words: Ischemic Stroke, raised homocysteine

Corresponding Author

Dr. Saad Ur Rehman

Medical officer RHC Nia Lahore,
Tehsil Gojra Distt Toba Tek Singh
Contact: +92 345-7482936
Email: dr.saad949@gmail.com

Submitted for Publication: 08-02-2017

Accepted for Publication: 22-12-2017

Article Citation: Rehman MS, Nadeem S, Kokab B. Raised Homocysteine Level in Ischemic Stroke. APMC 2017;11(4):325-7.

INTRODUCTION

Stroke is one of the most common neurological presentation that can not only lead to increased chances of morbidity but as well as mortality. The highest number of cases are found in Russia, Europe and Asia; however there is no predilection towards any particular region for this. Quality of life can be hampered by various neurological deficits.¹⁻² It can present in various ways depending upon the area of involvement in the brain, ranging from cranial nerve palsy to dense hemiplegia. Multiple risk factors can predispose for this. These include Diabetes Mellitus (DM), Hypertension (HTN), dyslipidemia, family history of ischemic heart disease and arterial diseases. Few of these are modifiable and the others are non modifiable risk factors.³

The data has shown that in the absence of all these above mentioned and well studied risk factors, people do suffer stroke; hence revealing more underlying and ill studied factors. Homocysteine (Hcy) is another such risk factor; which can be modified and in recent past is being widely studied globally. Homocysteine is a product which is formed due to metabolism of Methionine, an amino acid. It leads to a hypercoagulable state leading to embolization in the blood vessels leading to impaired blood supply. This alteration is affecting by various drugs, toxin and vitamins.

According to a study done by Han L et al, it was seen that increased homocysteine levels were both correlated in positive direction with increased chances of stroke as well as the severity of the disease.⁴⁻⁵ In a study from Pakistan raised homocysteine was observed in 58.3%⁶ while in another study it was seen in as high as 75% cases.⁷

Objective: To determine the frequency of raised homocysteine level in ischemic stroke.

METHODOLOGY

This was a cross sectional study. This was carried out at Department of Medicine, Shaikh Zayed Hospital, Lahore during March 2016 to November 2016. The 100 cases of either gender falling in the age range of 40-80 years were included. ischemic infarct was labeled on the basis of hypodense area on CT brain. Raised homocysteine level was labeled when the levels were more than 15 $\mu\text{mol/L}$.

Statistical Analysis: The data was analyzed by using SPSS version 21.0. Qualitative variables were presented in terms of frequency and percentages while quantitative variables were presented as mean \pm SD. Post stratification chi square test was applied and p value ≤ 0.05 was considered as significant.

RESULTS

In the present study there were total 100 cases of ischemic stroke, there were 60 (60%) males and 40

(40%) females. The mean age of the cases was 52.34± 6.57 years as in table 01. Raised homocysteine levels was seen in 60 (60%) of the cases. It was seen more in females affecting 24 (63.15%) cases with p= 0.48. It was near significantly high in age group 60-80 years where it was seen in 34 (65.38%) of cases with p= 0.09 as in table 02.

Table 1: Study demographics

	Mean	Range
Age	52.34±6.57	40-80 years
Duration of stroke	14.24±08.23	1-24 hours
Homocysteine level	21.34±7.18	3-45 µmol/L

Table 2: Stroke with respect to confounders

Variables		Stroke		
		Yes	No	
Gender	Male	36 (58.06%)	26 (41.94%)	p= 0.48
	Female	24 (63.15%)	14 (36.85%)	
Age groups	40-59 years	26 (54.16%)	22 (45.84%)	p= 0.09
	60-80 years	34 (65.38%)	18 (34.62%)	

DISCUSSION

Stroke is one of the diseases that pose a great health care burden due to disability and can affect the one's life as well as increases the cost in terms of providing home care facilities. That's why in cases of stroke, the major emphasis is on the prevention of the risk factors to avoid this unwanted complication rather than treating it.

In the present study raised homocysteine levels were seen in 60 (60%) of the cases. This findings was also supported by the results of the previous studies where they found its incidence around 40-75% in the previous studies in cases of ischemic stroke. They have also found positive correlation and strong association of raised homocysteine levels and severity of the stroke involving both the small and the large vessels.⁸⁻¹⁰

It was seen more in females affecting 24 (63.15%) cases with a non significant p value of 0.48. This finding was also similar to previous one where the female gender was considered an extra risk factor. In a study from China they also found female with higher risk for this; although they did not find this difference as statistically significant.¹¹ The reason can be explained by an extra risk due to hormonal

abnormalities comprising estrogen and progesterone imbalance especially in older age groups.

Homocysteine levels were near significantly high in age group 60-80 years where it was seen in 34 (65.38%) of cases with p= 0.09. These findings were again supported by the studies in the past and higher age has been shown an independent risk factor for ischemic stroke in cases of raised homocysteine levels.¹²⁻¹³ This can be due to increased likelihood of arteriosclerosis in older age group. Secondly menopause can also interfere the hormonal changes, which is another factor of this in females. Moreover, dietary abnormalities, electrolyte and vitamin imbalance is another entity that can interfere with homocysteine metabolism and lead to ischemic stroke.

CONCLUSION

Ischemic stroke is one of the fatal complication of raised homocysteine levels and it is near significantly associated with higher age.

REFERENCES

1. Kim AS, Johnston SC. Global variation in the relative burden of stroke and ischemic heart disease. *Circulation*. 2011;124:314–23.
2. Mukherjee D, Patil CG. Epidemiology and the global burden of stroke. *World Neurosurg*. 2011;76(6):85-90.
3. Han L, Wu Q, Wang C, et al. Homocysteine, ischemic stroke, and coronary heart disease in hypertensive patients: a population-based, prospective cohort study. *Stroke*. 2015;46(7):1777-86.
4. Fahimfar N, Khalili D, Mohebi R, Azizi F, Hadaegh F. Risk factors for ischemic stroke; results from 9 years of follow-up in a population based cohort of Iran. *BMC Neurology*. 2012;12:117-19.
5. Ashjazadeh N, Fathi M, Shariat A. Evaluation of homocysteine level as a risk factor among patients with ischemic stroke and its subtypes. *Iran J Med Sci*. 2013;38(3):233-39.
6. Sadiq M, Alam MT, Kanpurwala MA, Khan MS. Frequency of hyper-homocysteinaemia in ischemic stroke patients of Karachi. *J Pak Med Assoc*. 2014;64(9):1063-66.
7. Rahman A, Dasgupta R, Quraishi FA, Saha UK, Ali Z, Hossain S, et al. Association between plasma homocysteine level and ischemic stroke. *J Bangladesh Coll Phys Surg*. 2013;31:128-33.
8. Iso H, Moriyama Y, Sato S, Kitamura A, Tanigawa T, Yamagishi K, et al. Serum total homocysteine concentrations and risk of stroke and its subtypes in Japanese. *Circulation*. 2004;109:2766–2772.
9. Parnetti L, Caso V, Santucci A, Corea F, Lanari A, Floridi A, et al. Mild hyperhomocysteinemia is a risk-factor in all etiological subtypes of stroke. *Neurol Sci*. 2004;25:13–17.

10. Tay SY, Ampil ER, Chen CP, Auchus AP. The relationship between homocysteine, cognition and stroke subtypes in acute stroke. J Neurol Sci. 2006;250:58–61.
11. Hung CY, Wang KY, Wu TJ, Hsieh YC, Huang JL, Loh el-W, et al. Resistant hypertension, patient characteristics, and risk of stroke. PLoS One. 2014;9:e104362.
12. Hao L, Ma J, Zhu J, Stamp fer MJ, Tian Y, Willett WC, et al. High prevalence of hyperhomocysteinemia in Chinese adults is associated with low folate, vitamin B12 and vitamin B6 status. J Nutr. 2007;137:407-13.
13. Madonna P, de Stefano V, Coppola A. Hyperhomocysteinemia and other inherited prothrombotic conditions in young adults with a history of ischaemic stroke. Stroke. 2002;33:51-6.

AUTHORSHIP AND CONTRIBUTION DECLARATION

AUTHORS	Contribution to The Paper	Signatures
Dr. Saad Ur Rehman Medical Officer RHC Nia Lahore, Tehsil Gojra Distt Toba Tek Singh	Manuscript writing	
Dr. Saqib Nadeem Medical Officer Basic health unit Chak # 106 Tehsil Jahanian Distt Khanewal	Data Collection	
Dr. Bushra Kokab Medical Officer Children Hospital Multan	Final layout, Proof reading	