Original Article

Evaluation of plasma homocysteine level in ischemic stroke patients according to migraine history

Mehdi Maghbooli (MD) [*1]
Mazyar Hasanzadeh Kyani (MD) [2]
Mehran Yoosefi (MD) [1]

Abstract

Background: *As yet migraine has been established as one of the risk factors for ischemic stroke. Some of the factors have been assessed for the explanation of this relation. Hyperhomocysteinemia is seen partly both in stroke and in migraine. This study was conducted to determine the mean plasma levels of homocysteine in ischemic stroke patients on the basis of migraine history.*

Methods: *This cross-sectional study comprised of 100 consecutive patients who were admitted in Neurology Ward of Zanjan Vali Asr Hospital with definite ischemic stroke diagnosis (during 2008). In each patient, the age, gender, history and type of migraine, the time interval from the last migraine attack to stroke and fasting total plasma homocysteine level were ascertained.*

Results: *The mean level of total plasma homocysteine was 26.6±9.6 µmol/l. Fourteen out of 100 patients admitted with ischemic stroke had a history of migraine. The mean of plasma homocysteine did not differ significantly between the two groups with and without migraine (29.93±14.45 versus 26.1±8.6 µmol/l, p=0.165). Overall, 83% of patients had hyperhomocysteinemia, wherea,s this state was observed for 92.9% of migrainous and 81.4% of nonmigrainous subjects. The proportion of hyperhomocysteinemia was not different between these two groups (p=0.29). There were not any significant differences regarding the mean plasma levels of homocysteine regarding age, sex, migraine type, the time interval from the last migraine attack to stroke and vascular territory of stroke between these two groups.*

Conclusion: *The results show that the mean levels of homocysteine in ischemic stroke patients who had migraine was similar to those without migraine.*

Key words: *Ischemic stroke, Migraine, Homocysteine.*

Casp J Intern Med 2010; 1(2): 63-66.

1- Department of Neurology, Vali Asr Hospital, Zanjan University of Medical Sciences, Zanjan, Iran
2- General Physician, Vali Asr Hospital, Zanjan University of Medical Sciences, Zanjan, Iran.

*** Correspondence:**
Mehdi Maghbooli, Department of Neurology, Vali Asr Hospital, Zanjan University of Medical Sciences, Zanjan, Iran.
Post Code: 4515777978
E-mail: m.maghbooli@zums.ac.ir
Tel: +98-241-4269981
Fax: +98-241-7270751

Received: 25 Feb 2010
Revised: 4 Jun 2010
Accepted: 8 Jun 2010

Nowadays, stroke is the third cause of overall death in the world and one of the most common causes of human disability. Thus, it puts many personal, familial, socioeconomic and psychic brunts upon the society. Among some relatively new established risk factors of cerebrovascular accidents, both migraine and hyperhomocysteinemia have been lionized at recent decade. Migraine is going to be recognized as systemic vascular disorder (1). Meta analytic study of Etminan et al. revealed both classic and common migraine increase the risk of ischemic stroke (2). In a prospective study which was done by Kurth et al. showed that the risk of ischemic stroke in migrainous patients was1.7 folds more than those without migraine (especially in group below 55 years old) (3). Probably the coincidence of stroke and migraine indicates similar predisposing factor. Eikelboom et al. showed fasting plasma homocysteine levels in ischemic stroke individuals were more than the nonstroke group (4). Other studies demonstrated that hyperhomocysteinemia was an independent risk factor for ischemic stroke. Some surveys have proposed relationship between homocysteine and migraine (particularly with aura type).

Bottini et al. revealed that the homocysteine levels in migrainous patients were higher than that nonmigrainous group (5). Also, migrainous group had further magnitude of homozygous mutation in C677T gene (involved in MTHFR synthesis). It is known that homocysteine is a toxic agent for endothelium and considered as a risk factor for cerebral and cardiac infarcts and dementia.

It is worthy to mention that the correction of nutritional and social culture and supplemental use of vitamin B may reduce hyperhomocysteinemia in the serum. This study by considering the triangle in its top conformed from stroke, migraine and homocysteine aimed to assess the presence of any link, the fairly known relation of these 3 components to their established mutual relevance and evaluate homocysteine levels in ischemic stroke patients according to migraine history.

Methods

This is a cross-sectional study that was done on 100 consecutive ischemic stroke patients who were admitted in Neurology Department of Zanjan Medical University during the year 2008. These patients had abrupt onset focal neurologic deficit(s) with no known alternative to a focal vascular cause and the diagnosis of ischemic stroke was confirmed by clinical setting and brain CT scan and/or MRI (According to NIH stroke scale, developed by NINDS).

For each patient, the variables that were ascertained include migraine history and its type, age, gender, the time interval between the last migraine attack and stroke, vascular territory of stroke and fasting total plasma homocysteine levels.

After obtaining the informed consent through nonrandom convenience sampling, fasting venous blood sample (2ml) was drawn (during the first 3 days after the occurrence of stroke) and was sent to our laboratory. Then the plasma homocysteine levels were measured by Elisa and reported quantitatively (as µmol/l).

Hyperhomocysteinemia was defined as fasting total plasma homocysteine levels more than 15µmol /l. The diagnosis of migraine was established on the basis of international headache society (IHS) criteria. The data were analyzed by SPSS version11.5. The Student t test, Chi-square and Fisher exact test were used when appropriate.

Results

Forty-six men and 54 women with the mean age 69.13±13.2 years (ranged 5 to 95 years) were evaluated. Overall, 27cases were under 60 years of age and 73 cases were over 60. Fourteen out of 100 patients admitted with ischemic stroke had a history of migraine (9 females and 5 males). Eleven (78.5%) patients fulfilled the criteria of migraine without aura. The mean time interval between the last migraine attack and stroke was 4.4 years and 9 patients (64.3%) had an active migraine (at least one attack during the last 12 months).

The mean omocysteine levels (tHCY) were 29.93±14.5 µmol/lit in migrainous versus 26.1±8.6 µmol/lit in non-migrainous patients (p=0.16). Thirteen (92.9%) patients with migraine had hyperhomocysteinemia compared to 70 (81.4%) of patients without migraine (p=0.29).

The mean of tHCY levels were 28.2±8.9 and 25.25±10.06 µmol/lit in male and female patients, respectively (p=0.126). Eighty seven percent (40 cases) of men and 79.5% (43 cases) of women had hyperhomocysteinemia. No significant difference was found between migraine and hyperhomocysteinemia in both sexes. The mean of tHCY was 27.5±11.2 µmol/l in common migraineurs and 38.7±24.2 µmol/lit in classic migraineurs (p=0.254). According to gender, there was not a significant difference in mean tHCY level of migrainous patients in any of the age groups.

In hyperhomocysteinemic patients with migraine, all men had migraine without aura and 33.3% of women had migraine with aura (p=0.19). Eighty five percent (6 cases) of those who were under 60 had migraine without aura and it was observed in 66.7% (4 patients) who were above 60 years old. Active migraine was seen in 61.5% (8 cases) of hyperhomocysteinemic migraineurs and among them, 75% (6 cases) had common type of migraine. There was not a statistically significant association between the stroke vascular territory and the migraine type in high homocysteine subgroup (p=0.31).

The mean oF tHCY levels according to stroke vascular territory were as following: in MCA, 26.98±9.43 µmol /lit, in ACA, 25.38±6.1 µmol /lit, in PCA, 24.18±6.75 µmol /lit and in basilar, 30.65±24.4 µmol/lit (P=0.84). The mean of tHCY level did not differ according to the time interval from the last migraine attack to stroke in both sexes or in different age groups (p=0.18) (table 1).

Table 1 .The mean homocysteine levels in migrainous stroke patients according to gender and migraine activity

Homocysteine level Gender	Number	Mean±SD (µmol/L)	pvalue
Active*			
Female	6	29±13.6	0.75
Male	3	25.6±5.1	
total	9	28.2±12.02	
Inactive			
Female	3	37±20.2	0.46
Male	2	24.5±7.7	
total	5	33±19.3	

*Active migraine defined as less than 12 months time interval from the last migraine attack to stroke event

The mean of tHCY was 26.4±9.35µmol/l in 60 year old patients and below and it was 26.7±9.78µmol/l for those over 60 years old (p=0.889). Interestingly, the proportion of those with a normal level of tHCY was higher in patients older than 60 as compared to the younger group. Hyperhomocysteinemia did not show any significant association with migraine history in any of the age groups (figure 1).

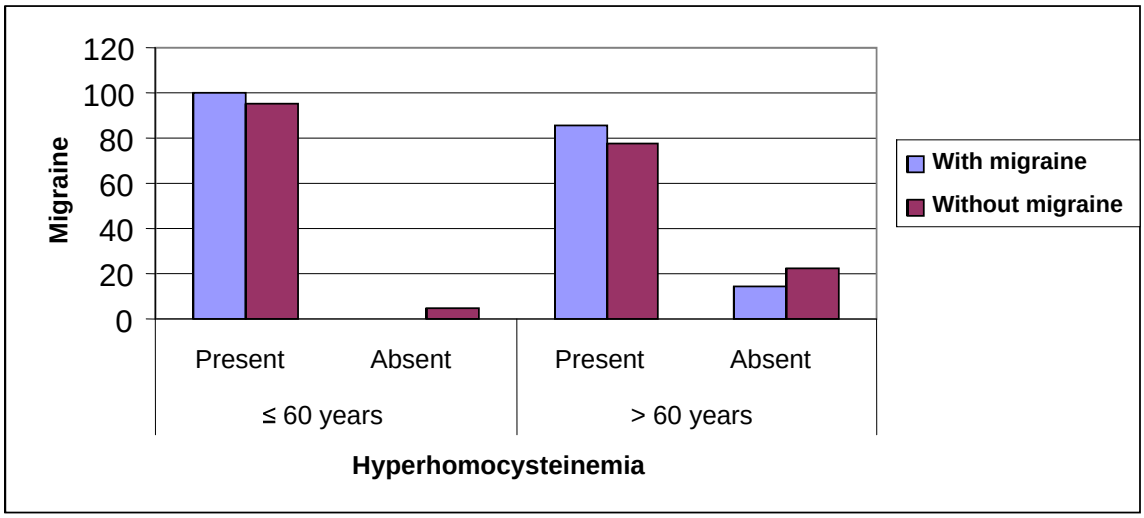

Figure1. Association between migraine and hyperhomocysteinemia in stroke patients based on age group

Discussion

In this study, we found that the mean fasting plasma homocysteine levels in migrainous subpopulation were higher than the migraine-free group (29.9±14.5 µmol/l versus 26.1±8.6 µmol/l, p=0.165). Overall, the mean tHCY level was 26.6±9.6 µmol/l which shows higher than that reported by Boysen et al. (mean=12.1±7.3 µmol/lit), Fallon et al. (mean=12.24 µmol/lit) and Yang et al. (mean=10.7 µmol/lit) (6-8). In a case-control study that was done by Alkali et al. the mean tHCY level in stroke patients was significantly higher than that in control group (20.8±10.2 µmol/lit versus 13.1±4.5 µmol /lit , P< 0.001) (9).

Fakhrzadeh et al. declared that the healthy men of Tehran population had mean tHCY level equal to 19.2±1.46 µmol/l and of women was 14.05±1.45 µmol/l [10]. They deduced the prevalence of hyperhomocysteinemia and folate and vitamin B deficiency in Iranians which was higher than those in developed countries.

In our study, the mean age of patients was 69.1±13.2 years. The mean tHCY levels in cases over 60 years was higher than that younger group (P=0.889). Consequently, in Haapaniemi et al. study, the mean tHCY levels of stroke patients in patients ≤60 years old group were lower than the older group (8.5 µmol/l versus 12.1µmol /l , p<0.001) (11).

Despite the more vigorous association of hyperhomocysteinemia with migraine history in female, there was not statistically significant difference in any of both sex groups. Three people (21.5%) migraineurs had aura type of migraine whose mean tHCY levels were higher than without aura migrainous group; but due to paucity of cases, this obvious difference is not veritable. Bottini et al. Hering et al. and Kurth et al. offered the absence of association between tHCY levels and migraine but Seo et al. and Kara et al. found that in favor of this association (3,5,12-14). We met patients with inactive migraine history (the time interval between the last migraine attack and stroke more than 1

year) who had further tHCY levels. This finding could be explained as vascular toxicity of homocysteine which causes hypertrophy of smooth muscle layer and reduce elasticity of vessels that result in headache subsidence. Finally, due to high frequency of hyperhomocysteinemia in stroke patients, we recommend to perform a larger survey to assess homocysteine, folate, vitamins B6 and B12 levels and MTHFR gene mutations in Iranian stroke patients. On the other hand, we need a stronger case-control study in which the case group of stroke patients with migraine and control nonmigrainous stroke patients to find out risk factors. In summary, the results of this study show that the mean levels of homocysteine in ischemic stroke patients who had migraine was similar to those without migraine.

Acknowledgement

This study was supported by the Research Center of Zanjan University Medical Sciences. The authors would like to thank the personnel of the Department of Neurology for their help in this study.

References

1. Tietjen GE. Migraine as a systemic disorder. Neurology 2007; 68: 1555-6.
2. Etminan M, Takkouche B, Isorna FC, Samii A. Risk of ischemic stroke in people with migraine : systematic review and meta-analysis of observational studies. BMJ 2005; 330: 63.
3. Kurth T, Slomke MA, Kase CS, et al. Migraine, headache, and risk of stroke in women a prospective study. Neurology 2005; 64: 1020-6.
4. Eikelboom JW, Hankey GJ, Anand SS, et al. Association between high homocysteine and ischemic stroke due to large- and small- artery disease but not other etiologic subtypes of ischemic stroke. Stroke 2000; 31: 1069-75.
5. Bottini F, Celle ME, Calevo MG, et al. Metabolic and genetic risk factor for migraine in children. Cephalalgia 2006; 26: 731-7.
6. Boysen G, Brander T, Christensen H, Gideon R, Truelsen T. Homocysteine and risk of recurrent stroke. Stroke 2003; 34: 1258-61.
7. Fallon UB, Elwood P, Ben-Shloma Y, et al. Homocysteine and ischaemic stroke in men. J Epidemiol Community Health 2001; 55: 91-6.
8. Yang TH, Chang CY, Hu ML. Various forms of homocysteine and oxidative status in the plasma of ischemic stroke patients as compared to healthy controls. Clin Biochem 2004; 37: 494-9.
9. Alkali NH, Watt H, Bwala SA, Gadzama A. Association of plasma homocysteine and ischemic stroke in a Nigerian population . Pak J Med Sci 2006; 22: 405-8.
10. Fakhrzadeh H, Ghotbi S, Pourebrahim R, et al. Total plasma Homocysteine, folate, and vitamin B12 status in healthy Iranian adults. BMC Public Health 2006; 6: 29.
11. Haapaniemi E, Helenius J, Soinne L, et al. Serial measurements of plasma homocysteine levels in early and late phase of ischemic stroke. Eur Neurol 2007; 14: 12-7.
12. Hering-hanit R, Gadoth N, Yavetz A, Gavendo S, Sela B. Is blood homocysteine elevated in migraine? Headache 2001; 41: 779-81.
13. Seo JH, Kim HJ, Lee IH, Choi BO. Association between migraine with aura and both homocysteine and MTHFR C677T polymorohism. J Korean Neurol Assoc 2004; 22: 200-5.
14. Kara I, Sazci A, Ergul E, Kaya G, Kilic G. Association of the C677T and A1298C polymorphisms in the 5, 10 methylenetetrahydrofolate reductase gene in patients with migraine risk. Mol Brain Res 2003; 111: 84-90.

This document was created with Win2PDF available at http://www.daneprairie.com.
The unregistered version of Win2PDF is for evaluation or non-commercial use only.