ORIGINAL RESEARCH

Homocysteine as a risk factor in patients with acute vascular events

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ABSTRACT
Background: Acute arterial vascular events are the leading cause of premature death and disability in the developed world. The present study was conducted to assess homocysteine as a risk factor in patients with acute vascular events.
Materials & Methods: 74 patients of ischemic heart disease,peripheral vascular disease, deep vein thrombosis and pulmonary thromboembolism of both genders underwent estimation of fasting plasma homocysteine estimation was done by fluorescence polarization immunoassay. Symptoms and risk factors such as hypertension, smoking, alcohol, diabetes, BMI and family history was recorded.
Results: Out of 74 patients, males were 40 and females were 34. Symptoms such as chest pain was seen in 62, headache in 57, breathlessnessin 52 and palpitations in 40. Risk factors were hypertensionin 34, diabetesin 30, alcohol in 16, smoking in 23, dyslipidaemia in 65 and family h/o CADin 40. The difference was significant (P< 0.05).
Conclusion: Plasma homocysteine is an independent risk factor for the development of acute vascular event.
Key words: atherosclerosis, hypertension, Homocysteine

INTRODUCTION
Arterial disease usually due to atherosclerosis, is the most prevalent chronic disease in the developed world and is rapidly increasing in importance in the developing world.[1] Although atherosclerotic arterial disease can cause stable or slowly progressive clinical syndromes, such as stable angina and intermittent claudication, the main clinical burden consists of acute, usually ischemic, vascular events.[2] Acute arterial vascular events are the leading cause of premature death and disability in the developed world.[3]
Homocysteine (Hcy) is a four-carbon amino acid with a free thiol group, which is formed by demethylation of methionine, an essential amino acid derived from diet.[4] Normal total Hcy (tHcy) concentrations range from 5-15 µmol/L in the fasting state.[5] Hyperhomocysteinemia (HHcy) has been classified into moderate (plasma tHcy concentrations of 15-30 μmol/L), intermediate (plasma tHcy concentrations of 31-100 μmol/L), and severe. Both acquired and genetic factors can have an impact on plasma tHcy.Major risk factors for CVDs are sedentary life style, cigarette smoking, alcohol, hypertension, high LDL cholesterol and diabetes mellitus.[6] Evidence from retrospective and prospective clinical studies indicates that elevated levels of homocysteine are associated with increased risk of CAD, Ischemic stroke and

peripheral vascular disease.[7]The present study was conducted to assess homocysteine as a risk factor in patientswith acute vascular events.

MATERIALS & METHODS

The present study comprised of 74 patients of ischemic heart disease,peripheral vascular disease, deep vein thrombosis and pulmonary thromboembolismof both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. Parameters such ad cardiac enzymes- CKMB, blood urea, serum creatinine &coagulation profile were done in all patients. Fasting plasma homocysteine estimation was done by Fluorescence polarization immunoassay (FPIA-ABBOTT-AXSYMUSA). Plasma homocysteine level greater than 15μmoles/L was considered as hyperhomocysteinemia. Symptoms and risk factors such as hypertension, smoking, alcohol, diabetes, BMI and family history was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 74		
Gender	Males	Females
Number	40	34

Table I shows that out of 74 patients, males were 40 and females were 34.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Symptoms	Chest pain	62	0.09
	Headache	57	
	Breathlessness	52	
	Palpitations	40	
Risk factors	Hypertension	34	0.17
	Diabetes	30	
	Alcohol	16	
	Smoking	23	
	Dyslipidaemia	65	
	Family h/o CAD	40	

Table II, graph I shows that symptoms such as chest pain was seen in 62, headache in 57, breathlessness in 52 and palpitations in 40. Risk factors were hypertension in 34, diabetes in 30, alcohol in 16, smoking in 23, dyslipidaemia in 65 and family h/o CAD in 40. The difference was significant (P< 0.05).

Graph I Assessment of parameters
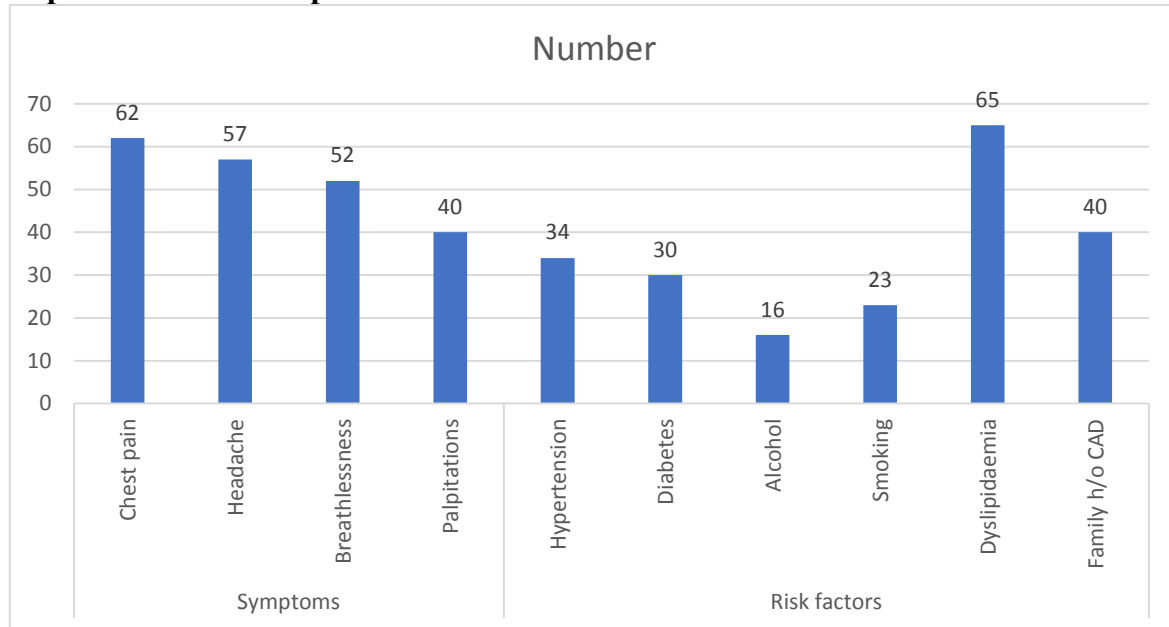
Table III Assessment of plasma homocysteine level

Risk factors	Mean	SD
Hypertension	24.6	2.1
Diabetes	23.9	3.5
Alcohol	24.1	3.2
Smoking	30.5	4.6
Dyslipidaemia	26.8	1.8
Family h/o CAD	27.4	6.2

Table III shows that mean plasma homocysteine level in hypertension was 24.6, in diabetes was 23.9, in alcoholics was 24.1, in smokers was 30.5, in dyslipidaemia was 26.8 and in family h/o CAD patients was 27.4.

DISCUSSION

Only about two-thirds of all episodes of symptomatic atherothrombotic vascular disease in developed countries can be attributed to established genetic and environmental vascular risk factors.[8] An additional causal vascular risk factor may be raised plasma levels of homocysteine (hyperhomocysteinaemia).[9] Although 30 years have elapsed since hyperhomocysteinaemia (and homocystinuria) were first associated with an increased risk of atherothrombotic vascular disease, it is only recently that sufficient evidence has mounted to suggest that the association is independent and dose-related and it remains to be established whether it is causal and modifiable.[10] WHO and World Bank data indicate that in India deaths attributed to coronary and cerebrovascular disease have increased markedly with the expanding population and will continue to increase.[11]The present study was conducted to assess homocysteine as a risk factor in patientswith acute vascular events.

We found that out of 74 patients, males were 40 and females were 34. Patil et al[12] found that most of the cases are between the age group of 60-69 years (55%). Youngest patient in this study is 20 years old. Males comprising 72%. Dyslipidemia (62%) was the most common risk factor followed by Smoking (53%). Hypertension (50%) and Diabetes mellitus (41%) are observed. Family h/o CAD (20%) was present and only (14%) patient was alcoholic. Overweight is present among 41% of patients. In this study significant number of patients (72%) have hyperhomocysteinemia. 47% of patients are moderate and 23% are intermediate.

Only 2 patients have severe hyperhomocysteinemia. Mean plasma homocysteine level was $11\pm3\mu$mol/L and is statistically significant. The mean plasma homocysteine was high among smokers when compared to non-smokers difference was highly significant. No much significant difference was noted in mean values of homocysteine among patients with other high- risk factors, such as alcohol consumption, diabetic, dyslipidaemia, BMI, family history of CAD. Hyperhomocysteinemia is seen in 38 out of 51 patients with cerebrovascular disease, 32 out of 42 patients with cardiovascular disease, one of 4 patients with peripheral arterial disease and one with deep vein thrombosis.

We found that symptoms such as chest pain was seen in 62, headache in 57, breathlessnessin 52 and palpitations in 40. Risk factors were hypertensionin 34, diabetesin 30, alcohol in 16, smoking in 23, dyslipidaemia in 65 and family h/o CADin 40. There has been an indication towards a significant correlation between hyperhomocysteinemia and cardiovascular disease and its complications such as heart attacks and strokes. It is believed that hyperhomocysteinemia leads to endothelial cell damage, reduction in the flexibility of vessels, and alters the process of haemostasis. Hyperhomocysteinemia may lead to an enhancement of the adverse effects of risk factors like hypertension, smoking, lipid and lipoprotein metabolism, as well as promotion of the development of inflammation. The prevalence of hyperhomocysteinemia may vary significantly between populations, and most likely depend on age, diet, and genetic background as well. Increasing age, male sex, smoking, coffee consumption, high blood pressure, unfavourable lipid profile, high creatinine and faulty diet are some of the factors associated with increased homocysteine levels.[13] On the other hand, physical activity, moderate alcohol consumption, good folate and vitamin B_{12} status are associated with lower homocysteine levels. Vegetarians may be at a higher risk of hyperhomocysteinemia due to low plasma B_{12} levels but the difference is likely to be insignificant.[14]

We found that mean plasma homocysteine level in hypertension was 24.6, in diabetes was 23.9, in alcoholics was 24.1, in smokers was 30.5, in dyslipidaemia was 26.8 and in family h/o CAD patients was 27.4.Ashjazadeh et al[15] found that the mean fasting Hcy levels was significantly higher in the cases than in the controls. The mean Hcy levels was elevated significantly in those with cardioembolic strokes compared with the controls. The plasma Hcy level was associated with an adjusted odds ratio of 2.17 for Hcy above 15 μmol/L concentration for all types of stroke.

The limitation the study is small sample size.

CONCLUSION

Authors found that plasma homocysteine is an independent risk factor for the development of acute vascular event.

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