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Original Research Article

A study of clinical profile and risk factors in Ischemic stroke with special reference to serum homocysteine and lipid profile: a cross sectional observation study

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ABSTRACT

Background: Ischemic stroke (IS) is one of the major reasons of disability and death throughout the world. Every year, around 4.4 million people die because of IS all around the world. The objective was to study clinical profile and risk factors in patients with IS and to find out the association of ischemic stroke with serum lipid and serum homocysteine level.
Methods: A cross sectional observation study was performed on 64 IS patients after dividing in to group 1 (n=10, age <40 years) and group 2 (n = 54, age >40 years) from December 2008 to November 2010. A detailed history, risk factors along with quantitative estimation of serum homocysteine, total cholesterol, triglyceride, low density lipoprotein and very low density lipoprotein was performed.
Results: The most common premonitory symptoms were headache (70% versus 31.48%), giddiness/vertigo (10% versus 24.07%) and tingling/numbness (40% versus 16.66%) in group 1 and group 2 respectively. Most of the patients were having stage 1 hypertension in Group 1 (50%) whereas in group 2 (53.65%) most of the patients were stage 2 hypertensive. The most common risk factors for IS were hypertensive (60% versus 90.65%) followed by diabetes mellitus (0% versus 62.9%) and transient ischemic attack (0% versus 42.55%) in group 1 and group 2 respectively. Most of the patients in were having moderate hyperhomocysteinemia in Group 1 (40%) and group 2 (24.05%) and only 10% and 11.10% of the patients were having mild hyperhomocysteinemia. In group 1 and Group 2, raised cholesterol, raised triglyceride, raised LDL and low HDL was recorded in 30% versus 42.55%, 30% versus 31.48%, 40% versus 68.45% and 60% versus 27.75% of patients respectively.
Conclusions: High level of homocysteine and abnormal lipid profile mainly increased LDL and decreased HDL -C level is associated with increased risk of ischemic stroke.

Keywords: Homocysteine, Ischemic stroke, Risk factor

INTRODUCTION

Ischemic stroke (IS) is one of the major reasons of disability and death throughout the world. Every year, around 4.4 million people die because of IS all around the world.[1] The prevalence of IS in rural area and in urban area of India is around 84-262/100,000 and 334-424/100,000. Reports have shown that around 2% of the hospital admission and 9-30% of neurological admissions are due to IS.[2,3] Documented traditional risk factors for IS comprises of non- modifiable risk factors which include age and male gender and modifiable risk factors such as hypertension, diabetes mellitus, hyperlipidemia, obesity, smoking and obesity.[4,5]

Homocysteine is an amino acid which contains sulfur; it is also reported to be one of the important risk factor for IS.[6] Increased level of low-density lipoprotein cholesterol (LDL-C) is a well-documented risk factor for coronary artery disease whereas high levels of high-density lipoprotein cholesterol (HDL-C) are protective.[7,8]

The present study was performed to study clinical profile and risk factors associated with patients with ischemic stroke and to find out the association of ischemic stroke with serum lipid and serum homocysteine level.

METHODS

The present cross sectional observation study was performed on 64 ischemic stroke patients admitted in CCMH, Bhilai, Raipur, India from December 2008 to November 2010. Patients with symptoms and signs suggestive of acute loss of focal or global cerebral function and evidence of ischemia on CT scan and/or MRI of head were included in the present study.

Patients with head injury, extradural hemorrhage, subdural hemorrhage, subarachnoid hemorrhage and intracerebral hemorrhage induced stroke were excluded from the study.

All the patients were divided in to Group 1 (n=10, 9 males and 1 female, age <40 years) and Group 2 (n=54, 39 male and 15 female, age >40 years). There were 9 thrombotic and 1 embolic cases in Group 1 whereas there were 51 thrombotic and 3 embolic cases in Group 2.

The diagnosis of ischemic stroke was made on the basis of history, clinical examination i.e. acute onset neurologic deficit and CT scan and MRI of the central nervous system. A detailed history along with peripheral vessels examination, examination for hyperlipidemia and history of angina was recorded.

Blood sample from each patient was obtained after a minimum of 12 hours of fasting and serum was prepared within two hours of collection. Quantitative estimation of serum homocysteine, total cholesterol, triglyceride, low density lipoprotein and very low density lipoprotein was performed. Data analysis was performed using IBM SPSS ver. 20 software. Student t test and ANOVA was applied as required. P value of <0.05 was considered as significant.

RESULTS

In present study there were 9 (90%) manual worker and 1 (10%) was sedentary worker in Group 1 whereas in Group 2, 38 (70.37%) were manual worker and 16 (29.63%) of them were sedentary workers. In present study during hospital stay 3 (4.68%) patients died in Group 2 only, out of this 2 (66.67%) were female and 1 (33.33%) was male.

Table 1: Distribution of patients according to different parameter.

Parameter		Group 1 (n = 10)	Group 2 (n = 54)
Premonitory symptoms	Headache	7 (70)	17 (31.48)
	Giddiness/vertigo	1 (10)	13 (24.07)
	Tingling/numbness	4 (40)	9 (16.66)
	Uneasiness	0 (0)	5 (9.25)
	Nausea/vomiting	3 (30)	1 (1.85)
	Visual disturbance	0 (0)	2 (3.70)
	Multiple syptoms	6 (60)	11 (20.37)
Blood pressure	Normal (<120/80)	3 (30)	2 (3.70)
	Pre-hypertension (120-139/80-89)	1 (10)	2 (3.70)
	Stage 1 (140-159/90-99)	5 (50)	20 (37)
	Stage 2 (≥160/≥100)	1 (10)	29 (53.65)
	BP not recordable	0 (0)	1 (1.85)
Risk Factors	HTN	6 (60)	49 (90.65)
	DM	0 (0)	34 (62.9)
	Stroke/TIA	0 (0)	23 (42.55)
	Heart disease	1 (10)	9 (16.66)
	Anemia	1 (10)	5 (9.25)
	SCD	1 (10)	0 (0)

	Hypothyroidism	0 (0)	1 (1.85)
	Multiple disease	0 (0)	31 (57.35)
	F/H of stroke	1 (10)	5 (9.25)
Time of onset of IS	Morning	4 (40)	24 (44.44)
	Noon	1 (10)	8 (14.81)
	Evening	3 (30)	19 (35.18)
	Night	2(20)	3 (5.55)
Activity level and onset of IS	Onset during activity	5 (50)	28 (51.85)
	Onset during rest	4 (40)	19 (35.18)
	Onset during sleep	1 (10)	7 (12.96)
Level of consciousness	Conscious	8 (80)	41 (75.92)
	Drowsy/confused	0 (0)	1 (1.85)
	Stupurous	0 (0)	2 (3.70)
	Comatose	2(20)	10 (18.51)
Convulsion		3 (30)	13 (24.05)

Data is expressed as no of patients (%), HTN; hypertension, DM; diabetes mellitus, SCD, TIA; transient ischaemic attack, IS; ischemic stroke, BP; blood pressure

Table 2: Distribution of patients according to different diagnosis.

Parameters		Group 1 (n = 10)	Group 2 (n = 54)
Hyperhomocysteinemia	Mild (20-30 µ mol/L)	1 (10)	6 (11.10)
	Moderate (31-100 µ mol/L)	4 (40)	13 (24.05)
	Severe (>100 µ mol/L)	0 (0)	0 (0)
Dyslipidemia	Raised cholesterol (>200 mg/dl)	3 (30)	23 (42.55)
	Raised triglyceride (>150 mg/dl)	3 (30)	17 (31.48)
	Raised LDL (>100 mg/dl)	4 (40)	37 (68.45)
	Low HDL (<40 md/dl)	6 (60)	15 (27.75)

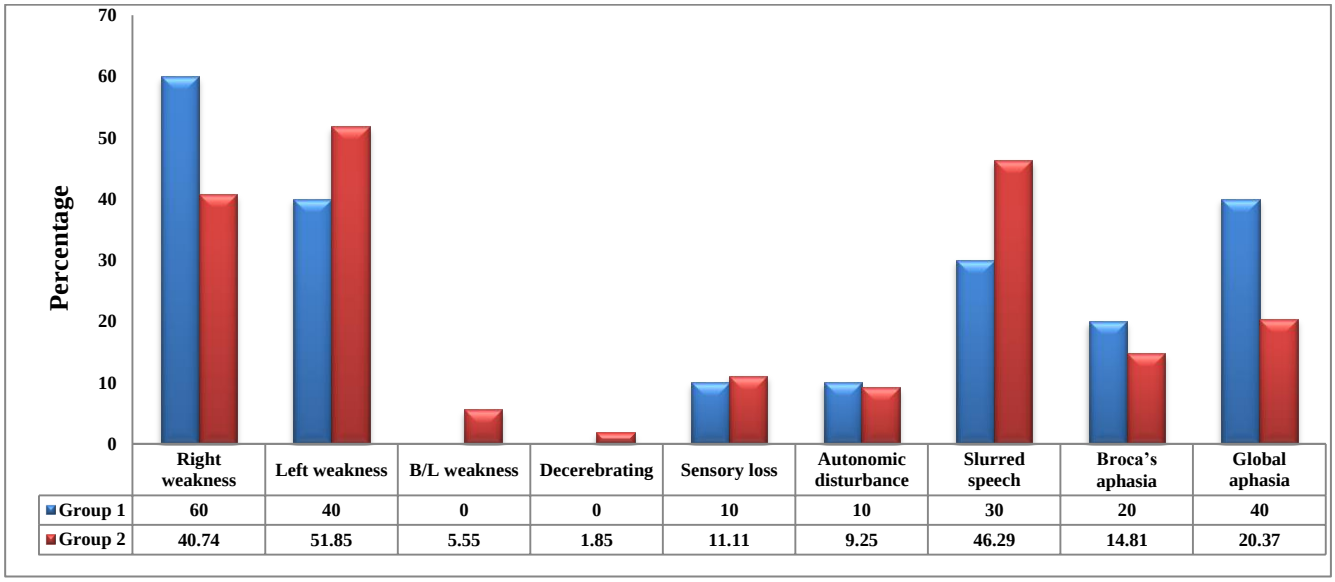

Figure 1: Focalneurological signs amongst study population.

DISCUSSION

Ischemic stroke is one of the most common neurological disease which can be life threatening for most of the patients.[9] Regardless of improvements made in the field of diagnosis and its management, still there are increase in number of IS which cannot be explained using conventional risk factors.[10]

Bhaskar et al studied homocysteine level on 68 IS patients and reported significantly higher level of homocysteine as compared to control Group. Hence they have proved homocysteine as an independent risk factor

for IS.[10] In present study also 40% in Group 1 and 24.05% patients in Group 2 had moderate hyperhomocysteinemia which supports the findings of Bhaskar et al.[10]

Homocysteine possess both prothrombotic and atherogenic properties.[11] Higher level of homocysteine elevates oxidative damage by reactive oxygen species.[12] Hyperhomocysteinemia being the risk factor of IS can be an important tool to screen patients with IS who demonstrate no clue for the presence of IS. This can be possible in patients who had family history of premature atherosclerosis and had IS in young age.[13]

Narang et al performed a similar study on 100 IS patients and reported higher serum homocysteine level in such patients.[14] There was no significant difference in serum homocysteine level among diabetic and non-diabetic patients whereas homocysteine levels were significantly higher in patients with hypertension as reported by Narang et al.[14] In present study, 60% and 90.65% of patients were hypertensive and 50% patients in Group 1 and 35.15% patients were having homocysteine levels more than 20 µ mol/L. Serum homocysteine level may change the vascular endothelial function hence leading to hypertension.[15] Willey et al did a similar prospective study on 2940 patients and reported that HDL-C, triglyceride and total cholesterol were not related to risk of IS but LDL-c level > 130 mg/dl as a time-dependent covariate was associated with increased IS risk.[16]

Bhaskar et al also studied the association between serum lipid level in patients with IS and reported a strong association between LDL-C and atherosclerosis development.10 In present study 40% and 68.45% patients in Group 1 and Group 2 have LDL-C level >100 mg/dl which is consistence with the Bhaskar et al. But a study done by Narang et al has reported a non-significant (P>0.10) correlation of serum homocysteine level with different lipid parameters in IS patients.[14]

Tan et al performed a similar study on 218 IS patients and reported most common risk factors of IS as hypertension, dyslipidaemia, smoking and diabetes.[17] In present study hypertension, diabetes mellitus, transient ischemic attack, heart disease and anemia were the most common risk factors for the IS which is in accordance to the Tan et al. The present study had few limitation of being low in sample size; a large clinical trial is required to confirm the results.

CONCLUSION

Present study has shown that hyperhomocysteinemia and dyslipidemia mainly increased LDL-C and decreased HDL-C level are important risk factor for IS and can be a useful tool for screening the IS patient.

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REFERENCES

1. Murray DJ, Lopez AD. Mortality by cause for eight regions of the world: global burden of disease study. Lancet. 2012;349(9061):1269-76.
2. Banerjee AK. Pathology of cerebrovascular disease.Neurology India. 2000;48(4):305-7.
3. Singh RB, Suh IL, Singh VP. Hypertension and stroke in Asia, prevalence, control and strategies in developing countries for prevention. J Human Hyper. 2010;14(10):749-63.
4. Fang XH, Kronmal RA, Li SC, Longstreth WT, Cheng XM, Wang WZ, et al. Prevention of stroke in urban China a community-based intervention trial. Stroke. 1999;30(3):495-501.
5. Danesi MA, Oneyola YA, Onitiri AC. Risk factors associated with cerebrovascular disease in Nigerians (a case-control study). E Afr Med J. 1983;60(3):190-5.
6. Modi M, Prabhakar S, Majumdar S, Khullar M, Lal V, Das CP. Hyperhomocysteinemia as a risk factor for ischemic stroke: an Indian scenario. Neurology India. 2005;53(3):297-302.
7. Stampfer MJ, Sacks FM, Salvini S, Willett WC, Hennekens CH. A prospective study of cholesterol, apolipoproteins, and the risk of myocardial infarction. N Engl J Med. 1991;325(6):373-81.
8. Yaari S, Goldbourt, Even ZS, Neufeld HN. Associations of serum high density lipoprotein and total cholesterol with total, cardiovascular, and cancer mortality in a 7-year prospective study of 10 000 men. Lancet. 1981;1(8228):1011-5.
9. Tranmer BI, Commichau CSL, Popp AJ. Ischemic cerebrovascular disease. In Popp AJ, Deshaies EM editor; Guide to the Primary Care of Neurological Disorders. 2nd edition, Thieme Medical Publishers, New York, 2007:288.
10. Bhaskar MV, Vennela D, Preethi AS. Study of homocysteine, lipoprotein (a) and lipid profile in ischemic stroke. Sch J App Med Sci. 2014;2(4):1247-50.
11. Schaller B, Graf R. Cerebral venous infarct ion: the pathophysiological concept. Cerebrovasc Dis. 2004;18(3):179-88.
12. Fischer M, Schaebitz W. An overview of acute stroke, therapy past, present and future. Arch Intern Med. 2006;160:3196-206.
13. Terwecoren A, Steen E, Benoit D, Boon P, Hemelsoet D. Ischemic stroke and hyperhomocyscysteinemia: truth or myth? Acta Neurol Belg. 2009;109(3):181-8.
14. Narang APS, Verma I, Kaur S, Narang A, Gupta S, Avasthi G. Homocysteine - risk factor for ischemic stroke? Indian J Physiol Pharmacol. 2009;53(1):34-53.

15. Sharabi Y, Doolmsn T, Rosenthal T. Homocysteine levels in hypertensive patients with a history of cardiac or cerebral atherothrombotic events. Amer J Hyperten. 1999;12:766-71.
16. Willey JZ, Xu Q, Boden AB, Paik MC, Moon YP, Sacco RL et al. Lipid profile components and risk of ischemic stroke. Arch Neurol. 2009;66(11):1400-6.
17. Tan KS, Navarro JC, Wong KS, Huang YN, Chiu HC, Poungvarin N et al. Clinical profile, risk factors and aetiology of young ischaemic stroke patients in Asia: a prospective, multicentre, observational, hospital-based study in eight cities. Neurology Asia. 2014;19(2):117-27.

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