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LIPID PROFILE STATUS IN NON-DIABETIC STROKE PATIENTS.

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Abstract
Background: To study serum lipid profile in non-diabetic patients with stroke and to determine whether there is any significant correlation between them.
Material &Methods: Total 50 stroke patients (Ischaemic 35 and haemorrhagic 15) and 50 controls were included in the study. Diabetic stroke patients, cerebrovascular accidents associated with head injury or brain tumour, pregnancy, patients on drugs for dyslipidaemia, were excluded from the study. Serum urea and creatinine and fasting serum lipid profile was done.
Results: 20 patients had elevated serum total cholesterol levels out of which 78.52% had Ischaemic stroke and 21.48% had hemorrhagic stroke. 10 cases had elevated serum Triglyceride levels of which 77.62% had Ischaemic stroke and 22.38% had hemorrhagic stroke. 75.40% of cases having elevated serum LDL cholesterol suffered from Ischaemic stroke where as 24.60% had hemorrhagic stroke.
Conclusions: A statistically positive correlation was found between serum total cholesterol, Triglyceride, LDL levels and the risk of stroke
Keywords: Dyslipidemia, Lipid Profile, Stroke

Introduction

In developing countries stroke is the third leading cause of death after heart disease and cancer, out of which 85-90% are ischemic and 10-15% are haemorrhagic.[1]

Ischemic stroke is often thought as a single entity but, in fact it may be the result of quite different disease processes. [2,3]

A stroke occurs when the blood supply to part of brain is interrupted or severely reduced, depriving brain tissue of oxygen and nutrients. This loss of blood supply can be ischemic because of lack of blood flow, or haemorrhagic because of bleeding into brain tissue.

A stroke is a medical emergency because it can lead to death or permanent disability. A stroke also is called a cerebrovascular accident, CVA, or "brain attack."

Stroke symptoms can include weakness in the arm, face, and leg, especially on one side of the body, confusion, slurring speech, vision problems, loss of balance, severe, sudden headache, and dizziness.

Stroke is notoriously difficult to treat and the ability to forecast stroke is critical but has been challenging making the detailed study of predisposing factors essential. The most common risk factors for stroke are, high blood pressure, high cholesterol, smoking, diabetes, and increasing age. There is good evidence that modification of risk factors will reduce the risk of stroke.[4]

The relationship between atherosclerosis and elevated serum lipids is well established. Aggressive treatment of dyslipidaemia decreases the risk of stroke. [4]

Recent studies have shown that distribution of triglycerides and cholesterol within major lipoprotein classes are of importance for the development of atherosclerosis, which is the precursor to stroke.[5] Hypercholesterolemia is a moderate risk factor for stroke.[6] The multiple risk factor intervention trial demonstrated increased mortality among men with high cholesterol levels.[5]

Elevated plasma concentration of low density lipoproteins (LDL) and low high density lipoprotein concentration (HDL) are associated with an increased risk of atherosclerosis. While there is an overwhelming amount of evidence relating high levels of serum total and LDL cholesterol and low levels of HDL cholesterol with coronary atherosclerosis, the relation between serum lipids, lipoproteins and cerebrovascular atherosclerosis is less clear.[7]

Studies of cholesterol levels in stroke patients have revealed results varying from insignificant changes to a moderate elevation. The meager reports available in Indian

patients who have different social, living and dietary habits compared to western population, prompted to undertake this study.

In our study, lipid profile was studied in non-diabetic patients with stroke. Diabetes itself is associated with hyperlipidaemia and increased atherosclerosis which makes it an undisputed risk factor for stroke. The atherogenicity of diabetics and non-diabetics is different. Hence, nondiabetic patients were included in the study.

Aims and Objectives

To study serum lipid profile in non-diabetic stroke patients

To determine whether there is any significant correlation between them

Materials and Methods

The study was conducted on 50 non-diabetic stroke patients. They were divided into two categories as patients with ischaemic stroke & patients with haemorrhagic stroke. 50 age- and sex-matched normal individuals who did not have a stroke were included as controls.

Design: This was a case control study conducted in department of General medicine, Medical ICU and Neurology OPD, M. Y. Hospital Indore over a period of one and half years from December 2005 to June 2007.

Inclusion Criteria

Cases: Fifty patients with stoke in computed tomography brain were included in the study. They were divided into two categories: 1. Patients with ischaemic stroke, 2. Patients with haemorrhagic stroke.

Controls: Fifty normal individuals of comparable age and sex served as controls for the study.

Exclusion Criteria

Cases: Diabetic stroke patients, cerebrovascular accidents associated with head injury or brain tumour, pregnancy, patients on drugs for dyslipidaemia, were excluded from the study.

Data Collection

1. A written informed consent was taken for all patients and controls. Institutional Ethics Committee approval was obtained before starting the study.

2. Data was collected with meticulous history, clinical examination with detailed neurological examinations along with appropriate investigations. A structured questionnaire was used to obtain data on family history of diabetes mellitus, history of hypertension, past and present illness, dietary pattern, addiction and medication.

3. Blood samples were collected from all patients and controls after an overnight fast of minimum 12 hr.

4. Five millilitres of blood were drawn from cubital fossa in sterile syringe and blood is collected in plain red top. The sample was centrifuged at 5000 rpm for 10 min in a centrifuge tube. Serum was separated within 2 hr of collection and the clear serum was pipetted out and stored at 4°C. Samples were analysed within 24 hr. Sample assay was done using the CIBA corning express plus equipment.

5. Serum TC, triglycerides LDL, HDL, and urea were estimated by enzymatic method. Serum creatinine was estimated by Modified Jaffes method while VLDL was a calculated parameter.

Results

In the present study, a total of 50 patients with complete stroke (ischaemic 35 and haemorrhagic 15) were included and 50 cases as control.

Table 1: Sex distribution in cases and controls

Group	Males	Females
Ischemic stroke patients	23	12
Haemorrhagic stroke patients	12	03
Total	**35**	**15**
Control	**38**	**12**

Out of 50 cases, 35 cases were of ischaemic stroke, of which 23 were male and 12 were female. 15 cases were of haemorrhagic stroke, of which 12 were male and 03 were female and out of 50 control 38 were male and 12 were female.

Table 2: Age & Sex distribution cases and controls

Age group	Control		Ischemic stroke		Hemorrhagic stroke	
	M	F	M	F	M	F
20-29	**3**	**0**	**1**	**0**	**0**	**0**
30-39	**5**	**0**	**1**	**0**	**0**	**0**
40-49	**10**	**3**	**5**	**1**	**5**	**0**
50-59	**7**	**4**	**8**	**4**	**3**	**0**
60-69	**10**	**5**	**7**	**5**	**4**	**2**
70-80	**3**	**0**	**1**	**2**	**1**	**1**
Total	**38**	**12**	**23**	**12**	**12**	**3**

In males, ischaemic stroke predominantly affected 50-59 age group whereas haemorrhagic stroke largely affected 40 -49 age group. In females, ischaemic as well as haemorrhagic stroke largely affected 60 -69 age group.

Table 3: Total cholesterol, Triglycerides, LDL, VLDL, HDL in cases and controls

Parameters (mg/dl)	Control (mean ± SD) M (38)	F (12)	Ischemic stroke (mean ± SD) M (23)	F(12)	Hemorrhagic stroke (mean ± SD) M (12)	F (3)
TC	170.48±19.33	173.55±19.18	218.19±51.43	237.13±56.90	175.43±48.47	205.52±30.50
Triglycerides	109±21.82	125±9.61	125.74±42.65	150.54±59.84	125.52±39.28	156±92
HDL	34.62 ±11.77	39.15±8.24	33.89±8.67	35.89±9.89	32.73±8.02	34.52±10.56
LDL	110.35±18.93	119.15±25.43	141.25±40.25	146.83±41.46	111.78±47.68	133.66±30.80
VLDL	17.75±3.52	21±1.61	21.23±7.04	26.03±10.39	21.03±6.62	27.15±16.01

- 78.52% patients having elevated serum cholesterol levels (total cholesterol > 240mg% according to the Adult Treatment Panel (ATP) III guidelines) fall in the ischaemic category whereas 21.48% fall in the haemorrhagic stroke category.
- It is observed that 77.62%of patients in the elevated serum triglyceride category (Serum triglyceride >200 mg% according to ATP III guidelines) had ischaemic stroke whereas the remaining 22.38% had haemorrhagic stroke
- It is observed that 75.40% patients having elevated serum LDL Cholesterol (serum LDL cholesterol > 160mg% according to ATP III guidelines) suffered from ischaemic stroke whereas the remaining 24.60% had haemorrhagic stroke.
- In the study of lipid profile among females, the level of total cholesterol, serum triglyceride, LDL and VLDL in patients affected with haemorrhagic and ischaemic stroke was higher than in the control population.
- In all three groups, the mean levels of serum total cholesterol, triglycerides, HDL, LDL and VLDL were higher in females than in males. Therefore it is concluded that females have higher levels of these lipids than that in males.

Discussion

Association between total Cholesterol and Non diabetics with stroke

In present study, elevation in total cholesterol was significant in non-diabetics with stroke compared to the control group (P<0.001)

Diabetes because of its common association with dyslipidaemia is a common cause of stroke.[8.] However, little is known regarding the clinical pattern, outcome and predictors of early mortality after stroke in patients without diabetes. Dyslipidaemia is also one of the major risk factor noted in patients of stroke without diabetes.[9]

The results of this study also corroborated with the results of other studies.[10,11]

Triglycerides association with non – diabetic stroke

The serum triglycerides were high in our patients compared to the control group of our study showing statistical significance (P<0.05)

The present study results were similar to other studies.[10,12,13,14]

Association of serum HDL Cholesterol

The levels of serum HDL cholesterol were not significantly different between cases and controls in this study, but one study did find that increased LDL levels and low HDL levels were associated with atherosclerosis.[15]

Association of serum LDL Cholesterol

Raised levels of serum LDL cholesterol had significantly higher risk (P < 0.001) of ischemic stroke in non-diabetics. These findings corroborate with Shreedharan et al (10) Another study also showed positive correlation between LDL cholesterol levels and risk of stroke.(14) It has also been seen that established atherosclerosis treated with statins lowers LDL cholesterol levels < 100 mg thereby decreasing the incidence of stroke. [16] Kurth T-6 et al 2007 also showed that there is a remarkable increase in serum LDL levels in ischemic stroke patients17

Association of serum VLDL Cholesterol

There have been conflicting results regarding VLDL levels and stroke. In this study there was no significant difference between the 60 non-diabetics with stroke and control group. Similar finding have been reported by Shreedharan et al, but the opposite has been reported by Bidyadhar7 et al 1984 who found that VLDL was raised in patients with stroke.

Conclusion

This study showed significant association of total cholesterol, triglycerides, LDL cholesterol in non-diabetics with stroke. High levels of total cholesterol, triglycerides, LDL cholesterol are associated with higher risk of stroke. Lowered HDL cholesterol levels were found to significantly decrease the possibility of a stroke. Dyslipidaemia is a tip in iceberg, which being a modifiable risk factor is capable of decreasing the incidence of stroke. Treating dyslipidaemias requires a holistic approach, taking into consideration the social economic status of patients that may not always be able to afford lipid lowering agents. Support in dietary modification and lifestyle modification, with timely

monitoring is important to control morbidity and mortality in ischaemic stroke patients.

Limitations

A prospective study of non-diabetic stroke patients with follow up would have been of greater value to draw more definitive conclusion.

References

1. Smith WS, English JD, Johnston SC. Cerebrovascular diseases. Hauser SL, Fauci AS, Longo DL, Kasper DL, Jameson JL, Loscanso J; Harrison's principles of internal medicine. 18th ed. New York Mc-Graw Hill 2012: 3270-99.
2. Wannamethee G, Shaper AG. Physical activity and stroke in British middle aged men Br Med J. 1992; 304:597-601.
3. McCall AL. The impact of diabetes on the CNS. Diabetes. 1992; 41:557-70.
4. Futterman LG, Lemberg L. Stroke risk, cholesterol and statins. Am J Crit Care 1999;8:416 419.
5. Tripathy BB, Das S. lipid disorders, implications and management. Indian col of Physiacian stroke. 2004; 25: 247-56.
6. Demchuk AM, Hess DC, Brass L, Yatsu FM. Is cholesterol a risk factor for stroke? Arch Neurol 1999;56:1518-1520
7. Dayton S, Chapman JM, Pearce ML, Popjak GJ. Cholesterol, atherosclerosis, ischemic heart disease, and stroke. Ann Intern Med 1970;72:97 109.
8. Jorgensen HS, Nakayama H, Raaschou HO, Olsen TS. Stroke in patients with diabetes: The Copenhagen Stroke Study. Stroke 1994;25:1977-1984
9. Gorelick PB, Mazzone T. Plasma lipids and stroke. J Cardiovasc Risk 1999;6:217 221
10. Sreedharan R et al.risk factors for ischemic stroke.A case control study.Neuroepidemiology 1992;11;24-30
11. Benfante R,Yano k, Hwang L-j et al.elevated serum cholesterol is a risk factor for both coronary heart disease and thromboembolic stroke in Hawaiian Japanese men.stroke1994;25;814
12. Tilvis RS Erkinjunti J ,SULKAVA R et al.serum lipids and fatty acids in ischemic stroke.American heart journal1987;113;615-619
13. AlbucherJF,Ferrieros J et al.serum lipids in young patients with ischemic stroke,a case control study.J Neurology Neurosurgery psychiatry 2000;69(1);29-33
14. Hatchinski V Graffagnino C,Beaudry,Bernier G, Buck,Donner A, SpenceD, DoidG & WolfeBMF 1996. Lipids and stroke a paradox resolved, Arch Neuro53; 303-308
15. Alok mohankar,Ravindrakumar Garg et al.serum lipids and stroke.neurology India 1993
16. Anseil BJ Cholesterol,stroke risk and stroke prevention.curr atheroscler rep 2000;2;92-96
17. Kurth T.Everett et al,Lipid levels and the risk of ischemic stroke in women.Neurology 2007;68;556-562
18. Bidyadhar S et al.Plasma lipids and lipoproteins in patients with premature IHD and ICD.Japi 1984; 32;11