Original Research Article

Serum lipid profile in patients with ischaemic stroke the correlation between them

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Objective: The purpose of the study was to study the serum lipid profile in patients with ischaemic stroke and to determine significant correlation between them.

Materials and Methods:

Study design : Cross sectional study of one year.

Study Centre : Patients admitted in the indoor wards of Medicine Department of Govt Medical College and Rajindra Hospital , Patiala.

Method of Collection of Data : A minimum of 50 patients aged >35yrs, both male and females who were diagnosed to have ischaemic cerebrovascular disease and who matched the inclusion and exclusion criteria were selected.

Results: Mean age in this study was 59.48 years. Among the study population, 24 (48%) were males and 26 (52%) were females. Most of ischaemic stroke patients (90%) fell in the 40-79 years age group and Dyslipidemia was observed in 78 % of ischaemic stroke patients enrolled in this study . Highest prevalence of ischaemic stroke is found in the 60-69 years age group. Among ischaemic stroke patients with dyslipidemia enrolled in this study the frequency of lipid profile derangements were as follows :

-Deranged HDL (males <35.3mg/dL, female <42mg/dL) in 61.5 % of

Ischemic stroke patients

-Deranged total cholesterol (>200 mg/dl) in 46.2 % of ischaemic stroke patients.

- Deranged Triglycerides in (>161mg/dL) in 25.6 % of ischaemic stroke patients.

-Deranged LDL in (>153mg/dL) in 23.1 % of ischaemic stroke patients.

-Deranged VLVL (>40mg/dL) in 7.7 % of ischaemic stroke patients.

Conclusion: Hence ,we could conclude from our study that dyslipidemia is associated with ischemic stroke. This also underlines the importance of identifying the risk factors of ischaemic stroke as early identification and modification of risk factors may help reduce the occurrence of stroke. However, more data and studies are required especially in Indian context to accurately define the relationship of dyslipidemia with ischmic stroke.

Introduction

Stroke is defined as "an abrupt onset of a neurological deficit that is attributable to a focal vascular cause(1). The WHO clinically defines Stroke as " the rapid development of clinical signs and symptoms of a focal neurological disturbance lasting more than 24 hours or leading to death with no apparent cause other than vascular origin ". It is the second most common cause of death and the fourth leading cause of disability worldwide(2). Annually, 15 million people suffer a stroke worldwide. Out of these, 5 million die and 5 million are left permanently disabled which puts a burden on the community(3). According to the WHO, stroke has been the second

most common cause of death over the past 2002-2012. As per recent studies on the Indian population, the age adjusted prevalence of stroke was between 250-350 per 100,000(4). Stroke can cause severe disability and even death.

Types of Stroke –Ischaemic
–Hemorrhagic

According to the American Heart Association Heart Disease and Stroke statistics (2005), it was reported that the frequency of the types of stroke is – Ischemic stroke (88%) which accounts for majority of the cases and Hemorrhagic stroke accounts for 12% of cases and that hemorrhagic strokes are more likely to result in death within 30 days compared to ischemic stroke.(5)

Objectives

To study the serum lipid profile in patients with ischaemic stroke and to determine significant correlation between them.

Materials And Methods

Study design : Cross sectional study of one year.

Study Centre : Patients admitted in the indoor wards of Medicine Department of Govt Medical College and Rajindra Hospital, Patiala.

Method of Collection of Data (including sampling procedure if any) :

Patients : A minimum of 50 patients aged >35 yrs, both male and females who were diagnosed to have ischaemic cerebrovascular disease and who matched the inclusion and exclusion criteria were selected.

The diagnosis of ischaemic cerebrovascular disease was made by :

1) Clinical setting

2) Evidence of infarct in brain by CT scan.

Inclusion Criteria :

1) Abrupt or relatively rapid onset of focal neurological disturbance with preservation of consciousness.

2) Gradual onset with smooth or stuttering progression over few hours.

3) CT scan brain suggesting infarction.

4) Only patients with complete stroke were considered for the present study.

Exclusion Criteria

1) Cerebral infarction associated with head injury.

2) Cerebral infarction associated with pregnancy, puerperium, dehydration, haematological disturbances, infections.

3) Patients who were on lipid lowering drugs.

The purpose of elimination of above mentioned subjects was to obtain a pure picture of the relationship between ischaemic stroke and serum lipids.

Investigations :

- CT scan brain
- Fasting lipid profile- Serum total cholesterol , Serum triglycerides, High density lipoproteins, Low density lipoproteins, Very low density lipoproteins
- Fasting blood sugar, blood urea, Sr.creatinine, Hb, TLC, DLC, ESR.

  Sample Collection : Venous samples under aseptic conditions were collected in standard vaccutainers i.e. Plain / clot activator vaccutainer for Lipid Profile ; 8-10 hrs fasting sample were collected.

  Lipid profile (TG,TC,HDL-C,LDL-C,VLDL-C)
- Triglycerides(TG) by GPO-PAP Method(6)
- Total Cholesterol(TC) by PAP Method(7)
- High density lipoprotein (HDL- C) by Modified PVS and PEGME coupled Classic precipitation method(8)
- Low density lipoprotein (LDL-C) by Friedewald Equation(9,10,11)
- Very low density lipoprotein (VLDL-C) by Friedewald Equation9,10,11

All the biochemical assays were analysed by using well established commercially available standardized kits and instruments (EM360)

Statistical analysis

Continuous variables were expressed as mean ± SD and categorical variables as count and percentage. Data was presented by using appropriate Bar charts and pie diagrams . Comparison between groups was performed using Student's test for continuous variables. Values were considered to be statistically significant if p Value <0.05. Data was analysed using

the Statistical Package for the Social Sciences (SPSS) version 20.

Observations and Results

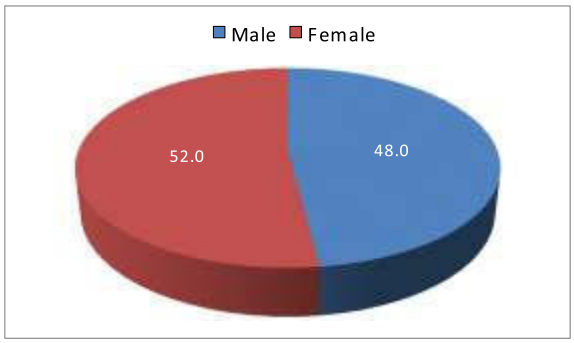
Most of ischaemic stroke patients (90%) fell in the 40-79 years age group in our study. Mean age in this study was 59.48 years and the highest prevalence of ischaemic stroke was found in the 60-69 years age group which was similar to the other studies. Among the study population, 24 (48%) were males and 26 (52%) were females.

Dyslipidemia was observed in 78 % of ischaemic stroke patients enrolled in this study. Among ischaemic stroke patients with dyslipidemia in this study, the frequency of lipid profile derangements were as follows :

- Deranged HDL (males <35.3mg/dL, female <42mg/dL) in 61.5 % of Ischemic stroke patients
- Deranged total cholesterol (>200 mg/dl) in 46.2 % of ischaemic stroke patients.
- Deranged Triglycerides in (> 161 mg/dL) in 25.6 % of ischaemic stroke patients.
- Deranged LDL in (>153 mg/dL) in 23.1 % of ischaemic stroke patients
- Deranged VLVL (>40 mg/dL) in 7.7 % of ischaemic stroke patients.

Hypertension was found in 60 % patients in our study. Diabetes mellitus was seen in 16 (32%) patients out of a total of 50 patients of ischaemic stroke. History of smoking was present in 9(18%) of patients in our study. Among the 30 patients of ischaemic stroke with hypertension in our study, 15 patients had decreased HDL. Statistical analysis shows a significant association between hypertension and HDL with a P value of 0.025. Among 16 of ischaemic stroke patients with diabetes in our study, 6 had increased LDL. The association between these two variables is statistically significant as p value is 0.022. Increased triglycerides was observed in 8 patients of ischaemic stroke with diabetes in our study. The association between diabetes and triglycerides is highly significant in our study as p value is 0.001.

Table1: Gender wise distribution of ischemic stroke patients in this study



Out of 50 total patients, our study population comprised of 48% males and 52% females.

Table 2: Patients with deranged lipid profile among ischemic stroke patients

	Number	Percentage
Deranged	39	78.0
Normal	11	22.0
Total	50	100.0

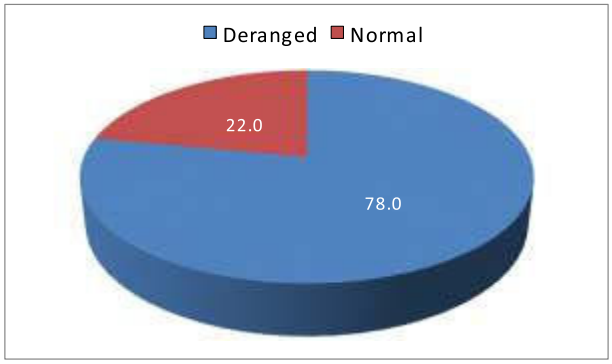
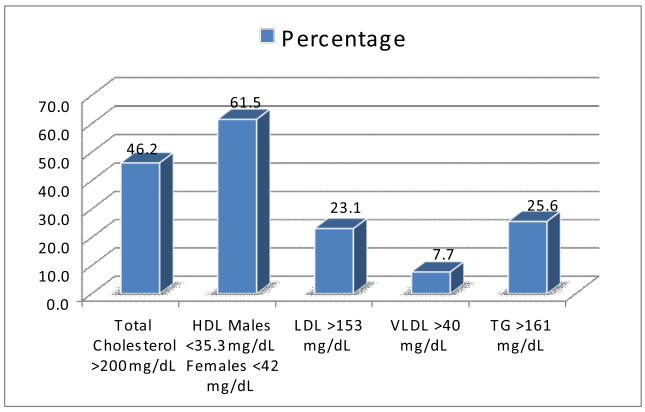


Table 3: Derangement in Lipid Profile out of 39 patients of ischemic stroke with dyslipidimia

	Number	Percentage
Total Cholestero l>200 mg/dL	18	46.2
HDL Males<35.3mg/dL Females<42mg/dL	24	61.5
LDL >153mg/dL	9	23.1
VLDL >40mg/dL	3	7.7
TG >161mg/dL	10	25.6



Discussion

In this study, out of 50 ischaemicstroke patients, 18 (36%) patients were in the 60-69 years age group, 12 (24%) patients were in the 50-59 years age group, 9 (18%) patients were in the 70-79 years age group , 6 (12%) patients were in the 40-49 years age group, 3 (6%) were in the 80-89 years age group, and the age group 30-39 years has 2 (4%) patients. Mean age in this study was 59.48 years.

In our study, maximum patients were between 60-69 years of age which is comparable to the findings of the studies mentioned below.

Al-Rajeh et al(12) (1989) in a study in KSA concluded that the frequency of stroke showed a constant increase with age until the 7th decade. Also , a study by Al -Eithan et al (13) from KSA (2009) noted that stroke happened mostly between 60-72 age groups which is comparable to present study, while those between 32-40 age group were least affected.

Al-Jadid etal (14) (2010) reported that the percentage of occurrence of stroke in the 60-72 age group was higher than in the 22-30 and 31-40 age groups.

The reason for stroke occurring most commonly in the older age groups is because of advanced atherosclerosis in old age.

Out of 50 total patients, our study population comprised of 48 % males and 52 % females.

Haberman et al (15) (1981) reported that there was a very little difference between males and females for cerebral infarction. While Yaqub et al (16) in 1991 reported there were more males as compared to females with regard to all type of strokes. Most other studies also show a male predominance in ischaemic stroke while our study showd female predominance. This discrepancy may be due to a difference in sample size, distribution of risk factors and age of the study population.

Prevalence of dydlipidemia in ischaemic stroke patients

Out of 50 patients with ischaemic stroke, 39 (78%) patients had deranged lipid profile while 11 (22%) had normal lipid profile.

Siddeswari et al (17) in their study found the prevalence of dyslipidemia in ischaemic stroke patients to be 92.5%

Singh et al (18) in their study observed the prevalence of dyslipidemia in ischaemic stroke patients to be 63.07%

Vijeth et al (19) in their study found the prevalence of dyslipidemia in ischaemic stroke patients to be70%.

Our study showd the prevalence of dyslipidemia to be 78% in ischaemic stroke patients which is comparable to the above studies.

Dyslipidemia pattern in ischaemic stroke patients

In our study, out of 39 patients with deranged lipid profile, the frequency of derangement in individual lipid profile is

- deranged HDL was seen in 24 patients (61.5%),
- deranged total cholesterol in 18 patients (46.2%),
- deranged triglycerides in 10 patients (25.6%)
- deranged LDL in 9 patients (23.1%)

And deranged VLDL in 3 patients (7.7%)

Ali etal (20) in a study found deranged HDL in 61.3% stroke patients with dyslipidemia.

Vijeth et al (19) in a study found the frequency of deranged HDL to be 54.1% in stroke patients.

Our study showed that decreased HDL is the most frequent derangement amongst ischaemic stroke patients with dyslipidemia which is comparable with the findings of the above studies.

Siddeswari et al (17) in their study found deranged HDL in 77% patients of ischaemic stroke with dyslipidemia

The next most common lipid profile

derangement was increase in Total cholesterol of 18 patients (46.2%) in our study

Habibi-koolaee et al (21) in a study found increased Total cholesterol in 41.6% patients of stroke.

Mythili et al (22) in their study found increased total cholesterol in 41.7% patients of stroke.

In our study, the frequency of increased total cholesterol in ischaemic stroke patients is 46.2% which is comparable to the above mentioned studies.

This is followed by increase in Triglycerides of 10 patients (25.6%) in our study

Ali et al (20) found increased triglycerides in 15.7% of stroke patients in their study while our study shows increased triglycerides in 25.6% patients of ischaemic stroke and this discrepancy may be due to difference in sample size and composition of the study population.

Patients with increased LDL were 9 (23.1%) in our study

Siddeswari et al (17) in a study showed 21.62% frequency of increased LDL in ischaemic stroke patients with dyslipidemia.

Ali et al (20) showed in the study the prevalence of increased LDLto be 28.57 % among stroke patients with dyslipidemia.

The present study shows 23.1 % of ischaemic stroke patients with dyslipidemia had increased LDL which is similar to the above mentioned studies.

The least common derangement in our study was increased VLDL which was found in 3 patients (7.7%).

Conclusion

This cross sectional study underlines the importance of identifying the risk factors of ischaemic stroke with dyslipidemia being an important modifiable risk factor. Stroke is an important cause of mortality and disability and increases the burden on healthcare. Early identification and modification of risk factors may help reduce the occurrence of ischaemic stroke thus reducing its morbidity, severity and mortality. However, more data and studies are required especially in Indian context to accurately define the relationship of dyslipidemia with ischaemic stroke.

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