ASSOCIATION OF LIPID PROFILE WITH DEPRESSIVE FEATURES IN YOUNG HYPERTENSIVES

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ABSTRACT

Objectives: To find out (a) the correlation of various components of serum lipids with depression score; (b) whether severity of depression differ between the people with normal serum lipids & dyslipidemia; and (c) whether the lipid components differ between depressed and non-depressed people.

Design: Cross Sectional Cohort study.

Place and duration of the study: This study was conducted at Sawai Man Singh Medical College and Hospital, Jaipur, India from January 2001 to June 2002.

Subjects and Methods: 100 young primary hypertensive subjects were included in this study. Their fasting blood lipid profile was ascertained and their depressive feelings were rated with the help of HAM-D.

Results: In this study, total lipids, high density lipoprotein, low density lipoprotein, very low density lipoproteins and triglycerides were positively correlated with the HAM D score. Depressed subjects (HAMD>17) had higher levels of total lipids (P=0.002), HDL (P=0.04), VLDL (P=0.02) and TG (P=0.001). Similarly subjects with higher cholesterol levels (P=0.05), normal HDL (P=0.003), normal LDL (P<0.001); higher VLDL (P=0.002) and higher TGs (P<0.001) had higher scores on HAM-D.

Conclusions: This study suggests that low HDL, high LDL protects from the depression. On the other hand, high cholesterol, VLDL and TG increase the risk of depression.

Key words: Hypertension, Young, Lipid profile, Depressive features.

INTRODUCTION

The correlation between the serum lipids and depression is debatable. Many attempts have been done to find out the correlation of hypercholesterolemia with depression. While some reports say that low serum cholesterol is associated with depression, other demonstrate higher depressive scores in patients with high cholesterol levels[1-3].

Correlation of low low-density-lipoproteins (LDL) has been shown with the depression[1]; similarly, low high-density-lipoprotein (HDL) and high triglyceride (TG) are reported to be associated with depression in another study[4]. However, Ergun et al[5] & Deisenhammer et al[6] did not find any correlation between these parameters. Huang et al[7] reported the role of TG, VLDL as the possible biological markers for depressive syndromes.

Not only the depression but also the suicidality is associated with the lipid levels. Lalovic et al[8] reported higher suicidal rates among biological relatives of subjects with partial deficiency of 7-dehydrocholesterol reductase enzyme. According to Rabe-Jablonska et al[1], low cholesterol & low LDL may be helpful in determining the suicidality among depressed. Kim et al[9] reported higher incidence of suicide among patients with low serum cholesterol. However, these studies are limited in number and results are conflicting.

Looking from the other perspective, depression is a state of constant stress and stress usually leads to the activation of HPA axis. This, in turn, may lead to dyslipidemia. Hence, we hypothesized that dyslipidemia should accompany depression[10].

Hence, present study was designed to assess: (a) the correlation of various components of serum lipids with depression score; (b) to find out whether severity of

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depression differ between the people with normal serum lipids & dyslipedemia; and (c) to find out whether the lipid components differ between depressed and non-depressed people.

SUBJECTS AND METHODS

In this study subjects with history of hypertension were recruited from the outpatient department of cardiology after taking written informed consent. Hypertension was defined as systolic blood pressure more than 140 mmHg and/or diastolic blood pressure more than 90 mmHg on three different occasions. Subjects who did not have working knowledge of English language, those having any other medical disorder at the time of interview, those suffering from secondary hypertension, those with history of substance use (except for tobacco and alcohol) or chronic inflammatory illness or endocrinopathies or congestive heart failure or myocardial infarction or arrhythmias or neurological or the other psychiatric illness were excluded. Illiterate subjects and those with major sensory disability or family history of psychiatric illness in the first degree relative were also not included. Diagnosis of disorders listed in exclusion criteria was made with the help of history, physical examination, routine laboratory investigations and wherever required special laboratory tests. It was done to ensure the picking up of uncomplicated hypertension even from the cardiology department.

After inclusion in the study, subject's demographic data and details regarding illness e.g., duration of hypertension, average systolic and diastolic blood pressure since onset of illness (calculated by records) were recorded.

Current alcoholism for this study was defined as anyone who was a social drinker or alcohol abuser at any point of time in his life and at least in past six months never met the criteria for alcohol dependence and took at any amount of alcohol in past fifteen days. Similarly, current smoker was defined as one who was smoking occasionally or meeting the criteria for nicotine abuse at any point of time in his life but at least in past six months never met the criteria for nicotine dependence (through smoking) and smoked at least one cigarette in past fifteen days.

In this study, depression was assessed with the help of Hamilton Rating Scale for Depression (HAM-D)[11]. This is an objective scale that does not require the subjects to be familiar with the language of the scale that is English. This is a commonly used scale to assess the severity of depression in our population. The cut-off value of 17, which indicates the presence of moderate depression, was chosen arbitrarily to diagnose presence of depressive symptoms**.** Those who scored score greater than 17 were termed "depressed" for the present study. We emphasize here that it should not be confused with clinical depression.

For the assessment of lipid profile, subjects were asked to come next day with overnight fasting & then the blood sample was drawn. Samples were sent to same laboratory to avoid error in the measurements. The lipid profile was estimated with the help of commercially available kit in the hospital laboratory. Cut off values to define dyslipedemia were as follows: Total Cholesterol > 200mg%, HDL <40 mg%, LDL > 130mg%, VLDL >35mg% & TG >160 mg%[12].

Statistical analysis was done with the help of SPSS v 11.0 for Windows. To find out the correlation between the HAM-D scores & various lipid components we used Pearson's Correlation Coefficient; To find out the difference between the means of two groups we used one tailed t test.

RESULTS

In this study, mean age of the subjects was 52 years and 76.47% were male. 86.89% subjects had studied for twelve to fifteen years and none of them was illiterate. Only 17.64% were current smokers, and 5.88% were current alcoholics. However, none of them fulfilled the criteria for alcohol-dependence syndrome.

Mean systolic blood pressure was 136.68 $\pm$ 27.22 mmHg and mean diastolic blood pressure was 89.7$\pm$ 18.32 mmHg. Serum Total lipids were 669 $\pm$ 220.4 mg%; total cholesterol 197.83 $\pm$ 66.92 mg%; HDL 41.54 $\pm$ 8.21 mg%; LDL 111.33 $\pm$ 66.92 mg%; VLDL 40.6 $\pm$ 24.1 mg% and serum triglycerides were 195.48 $\pm$ 112.72 mg%. Approximately 30% subjects had depression according to HAM-D.

Correlation of HAM-D score with lipid profile is shown in Figure 1.

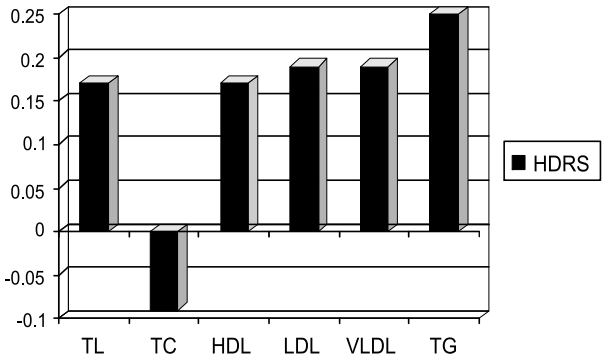

Fig. 1: Correlation of Lipid Profile with HAM-D score

Table 1 shows the levels of various components of lipid profile in depressed and non-depressed patients. It is noticeable that total lipids, VLDL and TG were higher in depressed subjects. More interestingly, HDL was higher in depressed subjects while LDL was not different among them.

Table 1

Difference between the mean serum lipid levels between depressed & Non depressed subjects.

Variable	Non Depressed	Depressed	One tailed 't' test
Total lipids	645.41 ± 249.38	773.07±93.59	0.002*
Total Cholesterol	201.43±77.21	196.69±31.68	0.34
HDL	40.83±7.9	44.82±8.41	0.04*
LDL	116.88 ± 72.51	102.3 ± 25.27	0.08
VLDL	38.35 ± 26.62	47.20 ± 15.3	0.02*
TG	181.11 ± 129.6	237.4 ± 29.4	0.001*

Table 2

Severity of HRSD scores between people with normal & abnormal serum lipids

Variable	Status	HAM-D score	One tailed t- test
Total Cholesterol	Normal Increased	12.09 ± 7.17 12.31 ± 5.75	0.05*
HDL	Normal Decreased	13.26 ± 6.9 10.45 ± 5.89	0.003*
LDL	Normal Increased	20.75 ± 6.89 8.0 ± 3.37	0.000004*
VLDL	Normal Increased	9.91 ± 6.02 13.91 ± 6.61	0.002*
TG	Normal Increased	8.18 ± 4.02 15.4 ± 6.6	0.0000006*

When the HAM-D scores were compared between normolipidemic & hyperlipidemic subjects, we found that persons with high Cholesterol, VLDL & TG had significantly higher scores on HAMD. While the subjects with decreased HDL & increased LDL had lower scores on the depression scale (Table 2).

DISCUSSION

One of the main findings of the study was poor correlation of the lipid profile with HAM-D scores, suggesting that lipid profile may not have direct implication on the depressive features. However, it must be remembered that what we have assessed is depressive features and not the clinical depression which was not seen in any of the subjects included in this study. It was interesting to note that contrary to all other parameters of lipid profile, only total cholesterol was negatively correlated with the severity of depressive features. This is contrary to the findings of Nakao and Yano[2] who reported higher prevalence of depression in hypercholesterolemic subjects. They also found that smoking, alcohol, exercise did not influence the cholesterol levels. They demonstrated that hypercholesterolemic subjects develop depression in the following year. This finding was seen in the present study also where, hypercholesterolemia was found to be associated with the high HAMD scores. However, the difference was too less to be clinically significant in this study population. In addition, few other studies did not find any correlation between cholesterol and depression making the issue debatable[1-3,10].

Very low density lipoproteins and triglycerides were higher in the depressed patients and vice-versa, subjects with higher TG and VLDL levels had higher scores on the depressive scales. This suggests the presence of chronic stress among depressed patients. Stress is known to increase the serum cortisol level and consequently mobilizes the fat from the adipose tissue to prepare the body to combat the stress[10]. Similar results were also reported previously[4,7]. Going along with the issue of serum cholesterol in depressed patient, contradictory studies on this matter are also available[5,6].

Many hypotheses have been proposed to explain this association- Firstly, serum lipids may affect the struc-

ture of the membrane of neurons, thus affecting neurotransmission.[14] Secondly, serum lipids may affect the diffusion of the amino acids & other substances that may affect the synthesis of neurotransmitters; or lastly, dyslipedemia may induce the atherosclerosis in the end arteries of the brain thus causing micro infarcts that may further induce the depression.

However, only few studies are available on this issue and this requires further research. Although the results of the present study open a new area for research in this specified group, yet they should be interpreted in the light of the methodological limitations. Firstly, depression was not diagnosed according to the DSM or ICD criterion. Only the depressive affect & its severity were taken into account. Secondly, we had taken the sample from the hospital thus sample bias is there and findings do not represent the community. Still the results have important clinical implications in a special population. Thirdly, the sample size is small owing to the limited resources and time. Future studies with better resources & larger sample size are needed. Fourthly, our results show the isolated affect of depression & hypertension due to the strict exclusion criterion. Such kind of subjects may not be usual in clinical practice, so the results should be interpreted with caution. In addition, additive effects of other pathologies should be borne in mind while comparing our findings with that of the clinical population. Fifth, due to the technical limitations we did not get the sreum cortisol measurement done for these patients. This measurement could have been more helpful in detection of pathophysiology. Lastly, cross sectional design of our study did not allow us to find if treatment of depression or lipid abnormalities can have an effect in either direction.

CONCLUSION

This study suggests that lipid profile may affect the depressive symptomatology in young hypertensive patients. This may have important therapeutic implications.

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