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Original Research Article

Comparative Analysis of Serum Lipid Profiles in Patients with Depressive Disorder

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Abstract:

Background and Aim: Evidence seems to suggest that dysfunction in many biological functions is associated with major depressive disorder (MDD). Literature suggests a possible link between different lipid parameters and depression. The study aimed to compare the serum lipid parameters of psychiatric depressed patients undergoing therapy with those of normal controls.

Material and Methods: The investigation was conducted over duration of one year. A cohort of 100 individuals diagnosed with depression, aged between 25 and 50 years, were chosen from the Psychiatry outpatient department. The control group of the study included one hundred healthy individuals who were matched based on gender and age group and did not have depression or use any other medication. The levels of serum total cholesterol (TC) and triglycerides (TG) were determined using spectrophotometry on an auto analyzer. The measurement of HDL-C was conducted using the Dextran sulphate Mg2+ precipitation technique. The calculation of LDL-C was performed using the Friedwald equation.

Results: The average age of the patients included in the study group was determined to be 30.22 ± 08.10 years, whereas the age in the control group was determined to be 33.89 ± 07.22 years. The average HDL cholesterol level of 100 participants in the study group was 49.62 ± 15.76 mg/dl, whereas it was 45.23 ± 2.12 mg/dl for the 100 participants in the control group. The average total cholesterol (TC) level of 100 participants in the study group was 180.12 ± 32.98 mg/dl, whereas it was 220.43 ± 79.29 mg/dl for the 100 participants in the control group.

Conclusion: Individuals diagnosed with Major Depressive Disorder exhibit a greater occurrence and frequency of hyperlipidemia compared to the general population. Individuals with serum lipid profile abnormalities are at an increased risk of developing cardiovascular disease.

Keywords: Cardiovascular Disease, Major Depressive Disorder, Serum Lipid Profiles, Serum Total Cholesterol.

Introduction

Psychiatric illnesses are more prevalent in those who are not married, divorced, separated, bereaved, or lacking intimate interpersonal connections. According to recent epidemiological study, the typical age at which Major depressive disorder starts is 24 years. However, it can begin at any point throughout a person's life. According to several research studies, the prevalence of this condition is twice as high in women compared to men. Urban residents living in nuclear households face a significant danger. Having other medical problems and being older significantly heighten the likelihood of experiencing depression. [1,2]

Cholesterol is very prevalent in the nervous system and has a significant impact on the fluidity, permeability, and nutrient exchange process of cell membranes. Cholesterol has a crucial role in several aspects of cellular structure and function inside the nervous system. Prior research, such as the study conducted by Hayward et al., discovered that individuals with panic disorder (PD) exhibited markedly elevated cholesterol levels in comparison to both patients with major depressive disorder (MDD) and individuals without any psychiatric conditions. Furthermore, Vietnam soldiers suffering from chronic posttraumatic stress disorder (PTSD) have been shown to have increased levels of total cholesterol, triglycerides (TG), and low-density lipoprotein cholesterol (LDL-C), as well as decreased levels of high-density lipoprotein cholesterol (HDL-C). [3-5]

Additionally, several investigations have discovered that the use of medication as a treatment for depression can regulate certain changes in lipid

parameters. The exact cause of this improvement, whether it is largely owing to the effects of antidepressants or the alleviation of depressed symptoms, remains uncertain.6 Given the intricate relationship between depression and serum lipid markers, it is necessary to do deeper investigation into this interaction. The study aimed to compare the serum lipid parameters of psychiatric depressed patients undergoing therapy with those of normal controls.

Material and Methods

The current investigation was conducted at the psychiatric department of the medical college and its related hospital. The investigation was conducted over duration of one year. A cohort of 100 individuals diagnosed with depression, aged between 25 and 50 years, were chosen from the Psychiatry outpatient department.

Patients were selected based on the International Classification of Diseases -10 criteria for depression. Prior to include people in the study, informed permission was acquired and the participants were provided with a detailed explanation of the study's nature and objective. Approval was obtained from the institutional ethics committee.

The control group of the study included one hundred healthy individuals who were matched based on gender and age group and did not have depression or use any other medication. The study adhered to certain criteria for including and excluding participants, which were as follows: The age group consists of males and females between the ages of 25 and 50. Patients who met the ICD 10 criteria for depressive illness and expressed a willingness to participate were included in the research. The study excluded patients with a recent history of drug misuse, borderline personality disorder, psychosis, or eating disorder. It also eliminated those with a known history of dyslipidemia, those currently undergoing treatment or following a specific diet, and those with a condition that is known to affect lipid metabolism.

The study covered the patients in the outpatient department (OPD) of the department. Their socio-demographic information was collected using a semi-structured proforma. Patients who met the study's criteria were told about the study's goal and provided signed permission.

The blood samples were collected following a 12-hour period of abstaining from food in order to analyse the lipid profile. The levels of serum total cholesterol (TC) and triglycerides (TG) were determined using spectrophotometry on an auto analyzer. The measurement of HDL-C was conducted using the Dextran sulphate Mg2+ precipitation technique. The calculation of LDL-C was performed using the Friedwald equation. The body mass index (BMI) was calculated by measuring an individual's weight and height.

Statistical Analysis: The data analysis was conducted using SPSS 15. The baseline data of the two groups were compared using a Chi-square test to analyze category variables. After controlling for BMI, the serum lipid profiles of two groups were compared.

Results

The research consisted of two distinct cohorts. There was a research group and a control group consisting of healthy individuals. Both groups had an equal number of participants. The socio-demographic characteristics of the patients involved in the study were documented and the data was analysed.

The average age of the patients included in the study group was determined to be 30.22 ± 08.10 years, whereas the age in the control group was determined to be 33.89 ± 07.22 years. The ratio of males to females was determined to be 1:1.5. The investigation of the age and sex distribution between the study and control group did not yield statistically significant results. The average BMI in the study group of 100 participants was 25.14 ± 3.94 kg/m2, whereas in the control group it was 22.12 ± 0.34 kg/m2. The disparity in BMI between the two groups exhibited statistical significance (P = 0.004).

The average LDL cholesterol level of 100 patients in the study group was 105.95 ± 55.69 mg/dl, whereas it was 145 ± 70.8 mg/dl for 100 people in the control group. The average HDL cholesterol level of 100 participants in the study group was 49.62 ± 15.76 mg/dl, whereas it was 45.23 ± 2.12 mg/dl for the 100 participants in the control group. The average total cholesterol (TC) level of 100 participants in the study group was 180.12 ± 32.98 mg/dl, whereas it was 220.43 ± 79.29 mg/dl for the 100 participants in the control group. There was no correlation seen between the blood cholesterol level and the degree of depression (P = 0.641). The serum lipid profile values of the patients and controls are shown in Table 1.

Table 1: Presents a comparison of the serum lipid profiles between the study group and the control group

Parameters	Study group	Control group
LDL	105.95 ± 55.69	145 ± 70.8
HDL	49.62 ± 15.76	45.23 ± 2.12
Triglycerides	180.12 ± 32.98	220.43 ± 79.29
Total cholesterol	176.15 ± 45.24	225.14 ± 62.24

Discussion

Major Depression is a significant contributor to the overall burden of disease in the general population, especially in the presence of escalating stress levels. Prior research has indicated a potential correlation between depression and dyslipidemia. The primary objective of this study is to assess the levels of blood lipids, including total cholesterol, triacylglycerol, LDL, HDL, and VLDL, in individuals diagnosed with Major Depressive Disorder. [7-9]

The cholesterol-serotonin hypothesis was first suggested to elucidate the connection between decreased cholesterol levels and depression. This hypothesis suggests that lowering serum TC levels may reduce the cholesterol content in brain cell membranes, which in turn decreases the micro-viscosity of the cell membrane. As a result, the protein serotonin receptor on the membrane surface is less exposed, leading to a decrease in the uptake of serotonin from the blood and a lower amount of serotonin entering brain cells. This, in turn, can contribute to the development of depression. [10,11]

Aksay et al [12]. concluded in their study that the alterations in lipid parameters resulting from the successful non-pharmacological treatment of depression with electroconvulsive therapy (ECT) are probably related to the antidepressant properties of ECT. In a study conducted by Eker et al., the researchers examined the metabolic effects of treating Major Depressive Disorder (MDD) with antidepressant medication. They discovered a clear impact of antidepressant treatment on serum lipids. However, they also proposed that the positive metabolic changes observed in MDD patients could be attributed to improvements in lifestyle factors such as regular physical activity and healthy eating habits, which may have occurred alongside the treatment and independent of the use of antidepressant drugs.

Conclusion

Individuals diagnosed with Major Depressive Disorder exhibit a greater occurrence and frequency of hyperlipidemia compared to the general population. Individuals with serum lipid profile abnormalities are at an increased risk of developing cardiovascular disease. This mechanism is believed to be linked to inflammatory processes, while its exact nature remains unclear and so needs more investigation.

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