

Original article:

A comparative study on serum lipid profile between pre menopausal and post menopausal women

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Abstract :

Introduction: Cardiovascular disease is a leading cause of mortality in both sexes in the world. There are several risk factors leading to cardiovascular disease like sedentary lifestyle, obesity, alcohol consumption, smoking, dyslipidemia, co-morbid conditions like hypertension, diabetes etc..The risk factor for cardiovascular disease increases markedly after menopause which may be attributed to the changes in the plasma lipid levels. Hence the present study was carried out to compare Lipid Profile between Premenopausal & Postmenopausal women.

AIM & OBJECTIVES: To compare the Lipid Profile in Premenopausal & Postmenopausal women.

MATERIAL & METHODS: After obtaining ethical committee clearance 50 Premenopausal & 50 Postmenopausal women were enrolled in the study after obtaining consent from each patient. Lipid profile was done & compared between both the groups.

RESULTS: In our study, we found out that LDL was significantly higher and HDL was significantly lower in post menopausal women when compared with premenopausal women.

DISCUSSION & CONCLUSION: From our study it is evident that the mean total cholesterol was higher but LDL was significantly higher and HDL significantly lower in post menopausal women thus increasing risk for cardiovascular disease

KEYWORDS: Lipid profile, menopause, estrogen, cardiovascular disease

INTRODUCTION:

Menopause is the natural process of ageing during which woman passes from reproductive to non reproductive phase with cessation of cyclic ovarian functions as manifested by cyclic menstruation⁽⁷⁾. This transition is normally not sudden or abrupt, tends to occur over a period of years and is a natural consequence of ageing⁽⁸⁾. The Cardiovascular diseases account for more than 50% of all deaths in women over 50 years of age⁽⁹⁾. Studies have shown that women are

at a lesser risk for developing coronary artery disease compared to males but this changes after menopause.^(1,2)The morbidity rates due to Coronary artery disease (CAD) increase after 45 years according to Framingham study.⁽³⁾ Coronary artery disease (CAD) is the single most important disease entity in terms of both mortality and morbidity in the entire world population.

Coronary artery disease (CAD) is the most important cause of death and disability among older women.

Circulating Serum Cholesterol, Low Cholesterol (LDL-C) and Serum Triglycerides are major risk factors of this disease. The incidence of cardiovascular disease after menopause may partly be due to changes in the plasma lipid level that occurs following menopause.^(4,5) The modification of profile may be important both in the prevention and control of coronary heart disease⁽¹⁰⁾. Estrogen leads to the increased risk of cardiovascular diseases after menopause, as evidenced by reduction in the cardiovascular diseases after hormone replacement therapy. Estrogen replacement therapy, through an effect on the blood vessel wall and on serum lipids, also appears to stabilize existing atherosclerotic plaques. Antithrombotic therapy, exercise and smoking cessation also contribute to reduced risk of cardiovascular disease in older women⁽¹¹⁾. In order to contribute to the better understanding of lipid profile status in postmenopausal women, the present study was conducted to estimate the serum levels of total cholesterol (TC), triglyceride (TG), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), very low density lipoprotein cholesterol (VLDL-C), and atherogenic index and compare it with premenopausal women. Studies have shown that women are at a lesser risk of developing cardiovascular disease than their male counterpart before menopause, but this advantage is abolished after menopause.^(1,2) Estrogen exerts cardio protective action by maintaining high level of HDL-C and lowering the LDL-C and triglycerides level. Therefore symptoms and diseases which are associated with estrogen deficiency are of increasing importance to women's health and so they are more prone to cardiovascular diseases after menopause. Our study is aimed to compare the lipid profile status in premenopausal who underwent regular

menstruation and post menopausal women. and to find out the prevalence dyslipidemia in premenopausal and postmenopausal women.

OBJECTIVE:

1. To investigate the relationship between lipid profile status in premenopausal and post menopausal women.
2. To find out the prevalence of dyslipidemia in premenopausal and postmenopausal women.

MATERIALS AND METHODS:

The present study was undertaken in the department of Biochemistry, in tertiary care institute. The period of study was from June 2016 to Dec 2016.

STUDY DESIGN

Study groups includes

Group-1: Fifty premenopausal women

Group-2: Fifty postmenopausal women

INCLUSION CRITERIA:

Suitable subjects who accept to take part in this research, Subjects with no history of any chronic disorder, Premenopausal women with a history of regular menstrual cycle.

EXCLUSION CRITERIA

The following subjects are excluded from the study:

Smokers, Alcoholics, Obese individuals those who are on exogenous hormone replacement therapy or lipid lowering drugs⁽¹²⁾.

Subjects with the following chronic disorders are also excluded:

- cardiovascular disease and hypertension,
- diabetes mellitus,
- hepatic, thyroid, renal, and gall bladder diseases

Clinical data

All the subjects included in the study were included in the study after getting informed consent. Each

patient underwent detailed clinical history, physical examination and investigations. In this study, we measured serum levels of lipid profile comprising of Total Cholesterol (TC), Triglyceride (TG), High Density Lipoprotein Cholesterol,(HDL-C), Low Density Lipoprotein Cholesterol (LDL-C) and Very Low Density Lipoprotein Cholesterol (VLDL-C). Estimation of plasma HDL level was done using Immune Precipitation Method, Total Cholesterol and Triglyceride using enzymatic method⁽¹³⁾, VLDL Cholesterol & LDL Cholesterol was calculated using the Friedewald Equation⁽¹⁴⁾

Students T – test and Pearson’s test of correlation are used for statistical analysis. P values of < 0.05 are considered to be statistically significant

Study duration: 7 months

METHODOLOGY:

In the assessment protocol, the daily eating and physical activity patterns are noted to minimize the effect of life style on lipid profile

COLLECTION OF BLOOD SAMPLE:

Fasting venous blood samples were collected from subjects after an overnight fasting of 12 – 14 hours. This however has to be done on the 7th day of the last of menstrual period for the pre menopausal group. 5ml of blood was drawn from all the above subjects from the anterior cubital vein using sterile disposable syringe and was used for lipid profile testing. Samples are centrifuged, and plasma separated and used for analysis.

MEAN LEVEL OF LIPID PROFILE IN PRE AND POST MENOPAUSAL WOMEN

S.NO	PARAMETER	PRE MENOPAUSAL WOMEN	POST MENOPAUSAL WOMEN
1.	TOTAL CHOLESTEROL	161.62	166.58
2.	TGL	136.8	122.82
3.	VLDL	27.36	24.56
4.	HDL	63.94	57.81
5.	LDL	70.32	84

Estimation of total cholesterol:

The total cholesterol is estimated by the enzymatic method.

Normal Range – less than 200 mg/dl

Estimation of HDL:

HDL is estimated by the immune precipitation method .

Normal Range – more than 40 mg/dl.

Estimation of triglycerides:

The triglyceride level is estimated by using enzymatic method.

Normal Range – less than 150 mg/dl

The serum LDL and VLDL are calculated by using Friedwald’s formula:

VLDL = TGL/5, Normal Range of VLDL – less than 30mg/dl

LDL (c) = (TC – HDL (c) – TGL/5) mg/dl.

Normal Range of LDL – less than 120mg/dl

STATISTICAL ANALYSIS

Statistical data was recorded in Microsoft Excel . Data was analyzed using prism SPSS software. The values were quoted in the form of mean ± standard deviation wherever required. Data between two groups was compared using unpaired student’s t-test. The p value (p< 0.05) is considered as significant and the p value (p< 0.001) is considered as highly significant.

PREVALENCE LEVEL OF DYSLIPIDEMIA IN PRE AND POST MENOPAUSAL WOMEN

S.NO	PARAMETER	PRE MENOPAUSAL WOMEN	POST MENOPAUSAL WOMEN
1.	TOTAL CHOLESTEROL	5(10%)	4(7.8%)
2.	TGL	19(38%)	12(23.5%)
3.	VLDL	19(38%)	12(23.5%)
4.	HDL	48(96%)	48(94.1%)
5.	LDL	3(6%)	10(19.6%)

COMPARISON OF LIPID PROFILE BETWEEN PRE AND POST MENOPAUSAL WOMEN

S.NO	PARAMETER	P VALUE	SIGNIFICANCE
1.	TOTAL CHOLESTEROL	0.43	NS
2.	TGL	0.136	NS
3.	VLDL	0.136	NS
4.	HDL	0.012	HS
5.	LDL	0.045	HS
STUDENT T TEST: P-VALUE= 0.05(SIGNIFICANT)			

RESULTS:

The present study was carried out between June 2016 to Dec 2016. The mean level of lipid profile was assessed in both the groups (premenopausal and postmenopausal women) and it was found to be within normal range in both the groups. The prevalence level of high total cholesterol is 10 % in pre menopausal and 4.8 % post menopausal women, prevalence level of high TGL & VLDL is 38 % in pre menopausal and 23.5 % post menopausal women, prevalence level of high HDL is 96% in pre menopausal and 94.1 % post menopausal women, prevalence level of high LDL is 6% in pre menopausal and 19.6 % post menopausal women.

On comparing the mean lipid level between pre and post menopausal women showed higher level for LDL which compares well with the study done by Rajesh K Jambhulkar et al(2015), Awanti et al (2011)⁽¹⁷⁾, while it was comparatively lower for TGL, VLDL & HDL in Postmenopausal women. The comparatively lower level of HDL also correlates

with the study done by Rajesh K Jambhulkar et al(2015), Awanti et al (2011). They have suggested that the decreased cholesterol level & higher HDL level may be due to normal estrogen level in pre menopausal and which decreases after menopause. The significantly higher level of HDL may be important in pre menopausal since HDL is important in reverse cholesterol transport. Our study also correlates well with Usoro et al (2006)⁽⁷⁾. The significantly higher level of LDL(0.045) & significant lower level of HDL (0.012) in post menopausal women may be due to protective effect of estrogen which prevents development of atherosclerosis or CAD. The significantly lower level of HDL in post menopausal women may also be due to hormonal changes as suggested by Sultan et al⁽¹⁸⁾ which may also be a reason for the increased cardiovascular disease risk. After menopause due to estrogen deficiency, there will be increased plasma LPL (lipoprotein lipase) and hepatic triglyceride lipase activity causing plasma LDL accumulation and

also leads to down regulation of LDL receptors. The higher the small dense LDL proportion which characterizes the atherogenic shift, higher is the LDL oxidation and these particles are associated with a threefold increase in CAD risk. During menopause , concentration of triglyceride also increases which may be related to insulin resistance and increase in the abdominal fat amount. Menopause causes a decrease in HDL concentration and changes in HDL structure as well. The concentration of HDL₂ decreases while concentration of HDL₃ increases. HDL concentration is in inverse proportion with abdominal fat. Estrogen increases the nitrous oxide production changing the vascular tone, lowering the cholesterol level, alters fibrinolytic proteins, stabilizes the endothelial cells, enhance the anti atherogenic effect. All these effects are lost in postmenopausal women. Hence postmenopausal women with dyslipidemia may be due to mainly hormonal changes which may be the reason for being more prone to cardiovascular disease.

CONCLUSION:

From our study it is evident that the mean values of total Cholesterol, LDL were higher and HDL was lower in premenopausal women due to estrogen deficiency when compared with pre menopausal women. Dyslipidemia occurs due to multifactorial reasons like physical activity, life style, diet, smoking, alcohol consumption, ethnicity and genetic makeup. So further extensive studies with importance to the duration following menopause need to be done to understand the underlying mechanisms.

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