

Short Communication

AGE RELATED DIFFERENCE IN THE LIPID PROFILE IN NORMAL HEALTHY WOMEN

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Abstract :

Background and objectives : Lipid disorder is a major risk factor for the progression of coronary artery disease. Age alone is a significant predictor of CVD risk in men and women. Before menopause, women have a much lower risk for cardiovascular events compared with men of their age. Reasons for protection from CVD in premenopausal women are complex, but a significant contribution can be assigned to the greater high-density lipoprotein (HDL) levels in younger women, which is an effect of estrogen.

Methods : Fasting blood samples were collected from 40 healthy individuals (40 females divided into 2 groups according to age). Serum total cholesterol, triglycerides, and HDL- Cholesterol were estimated by enzymatic methods and LDL was calculated by Friedewald's equation.

Results : The result showed increase in total cholesterol, triglyceride and LDL-Cholesterol and decrease in HDL-Cholesterol in women in perimenopausal period as compared to women in the younger age group.

Conclusion: It can be concluded that serum lipid profile changes can possibly be mediated by changing hormonal profile, especially estrogen which has role in lipid metabolism and indirectly on coronary artery disease.

Keywords: Coronary artery disease, Friedewald's equation, perimenopausal period.

Introduction:

A Woman, from her intrauterine life till the end of life, experiences different stages in her reproductive life, under the influence of female hormones, which is a physiological process.¹

The sex hormones which are secreted in minute quantities undergo changes in levels according to different phases of her reproductive life. They not only play an important role in women's reproductive life but also influence metabolism in a significant way. They play an important role in lipid

metabolism especially estrogen. This affects mainly serum cholesterol and lipoproteins and hence has an indirect role in coronary heart diseases.¹

During the menopausal transition, more erratic fluctuations in female reproductive hormones are seen.²

A more rapid depletion of ovarian follicles starts in the late 30s and early 40s and continues until a point at which the menopausal ovary is virtually devoid of follicles.

These changes, including the increase in FSH levels, reflect the reduced quality and capability of aging follicles to secrete inhibin⁴. As follicular depletion continues, episodes of anovulation become more common⁵.

Cardiovascular disease (CVD), including coronary heart disease, congestive heart failure, and stroke, is the leading cause of death in both men and women⁸.

Risk factors are the same for men and women and include family history of cardiovascular disease, hypertension, smoking, diabetes mellitus, abnormal cholesterol/ lipoprotein profile, and obesity.

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Age alone is a individual risk factor of CVD in men and women.

The risk of CVD increases exponentially for women as they enter menopause and estrogen levels decline^{9,10}.

This becomes vitally important for women in menopausal transition, when preventive measures can significantly improve both the quality and the quantity of their lives.

Women in younger age group, have a much lower risk for cardiovascular events compared with men of their age. Reasons for protection from CVD in younger women are complex, but a significant contribution can be attributed to the greater high-density lipoprotein (HDL) levels in younger women, which is an effect of estrogen.

Moreover, total cholesterol and low-density lipoprotein (LDL) levels are lower in premenopausal women than in men of same age group¹¹.

But, with the subsequent decrease in estrogen, this favorable effect on lipids is lost. High-density lipoprotein levels decrease and total cholesterol levels increase.

Despite these changes in atherogenic lipids following menopause, total cholesterol and LDL levels can favorably be reduced by dietary modifications, estrogen treatment, and lipid-lowering medications⁹.

The result showed increase in total cholesterol, triglyceride and LDL-Cholesterol and decrease in HDL-Cholesterol in women in perimenopausal period as compared to women in the younger age group.

Material and methods:

40 healthy women were randomly selected for the study, and divided in two groups.

Group1: women in 20-35yrs

Group 2: women in 35-50yrs

2ml of fasting blood (8-12hrs fasting) was collected using sterile dry vacutainer syringe, centrifuged within 30mins and following parameters were analyzed

- 1) Serum total cholesterol by CHOP-PAP method

- 2) Serum Triglycerides by GPO-Trinder method
- 3) HDL- Cholesterol by Direct enzymatic method
- 4) LDL was calculated by Friedewald's equation

Statistical analysis:

Data was analyzed statistically by SPSS17

Mean, standard deviation, and standard error were determined for each group.

Comparison of differences in mean of these groups was analyzed using students –t test and p- value was calculated. P-value of <0.05 was considered as significant.

Results:

Significant increase in Total Cholesterol, Triglyceride, and LDL and decrease in HDL were observed in women in menopausal transition period compared to women in younger age group. This is showed in Table no 1 and Figure 1.

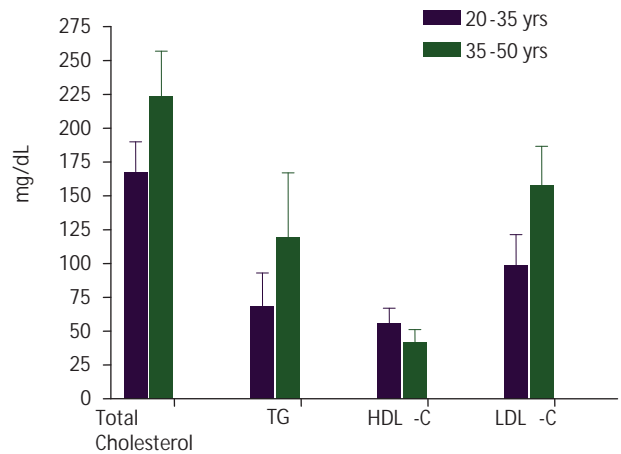


Fig 1: Bar diagram showing comparison of total cholesterol, triglyceride, HDL and LDL in group 1 and 2.

Biochemical parameters (Mean±SD)	Group 1 (n=20) Age 20-35 yrs	Group 2 (n=20) Age 35-50yrs	P-value
Total cholesterol (mg/dl)	167.80±22.16	223.65±33.20	<0.0001*
Triglyceride (mg/dl)	68.90±24.08	119.10±47.88	<0.0001*
HDL-C (mg/dl)	56.1615±10.70	42.1500±9.05	<0.0001*
LDL-C (mg/dl)	98.6850±22.55	157.6700±28.94	<0.0001*

Table 1 shows mean, standard deviation, and p-value for TC, TG, HDL, LDL in group1 and group2

Discussion:

So far comparison has been made between the lipid profiles in women of pre-menopausal and post-menopausal age groups. In present study we have compared the lipid profiles of young women and women in perimenopausal age group.

The results in present study showed total cholesterol, and LDL-C increased in menopausal transition period, this is consistent with results from studies suggesting that increases in total cholesterol and low density lipoprotein cholesterol are gradual, occurring late in the menopause transition. Matthews et al.¹⁵ reported that the transition from pre- to early perimenopause was not associated with significant changes in low density lipoprotein cholesterol, with changes occurring later in the transition. A small prospective study has shown a gradual increase in low density lipoprotein cholesterol during the menopause transition that continues during the year following menopause. Another study concluded that LDL increases significantly from reproductive period to postmenopausal period. The rise in LDL can also be attributed to age but the significant raise after menopause is also attributed to hormone levels.¹

There was lowered LDL-C levels after the treatment with oral estrogen in postmenopausal women, so increase in LDL-C in present study can be attributed to the hormonal changes especially estrogen. High estrogen level in younger women has a beneficial effect lowering the LDL-C by acting on LDL receptors⁽¹⁸⁾

We also observed increase in triglyceride, which could be due to hormonal effect on the lipid metabolism independent of age or can be attributed to age as given by few authors. Gandhi B M demonstrated Triglyceride in plasma increased with age.¹⁷

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We also observed decrease in HDL-cholesterol in perimenopausal women as compared to younger women. As few studies have shown^(18, 21) that oral cyclical estrogen sulphate raised HDL-C. Increases in the HDL-C is caused by increased production of apo A1 and decreased hepatic lipase activity, hence, this decrease is attributed to hormonal changes. One study showed HDL-C increases upto menopause and later decreases. This is due to hormonal changes.¹ but in present study there was significant decrease in HDL-C in perimenopausal period itself rather than in postmenopausal period.

The average HDL cholesterol in women is 55 to 60 mg/dL and a decrease in HDL cholesterol of 10 mg/dL increases coronary heart disease risk by 40 to 50 percent.¹⁴

The risk of CVD increases exponentially for women as they enter menopause and estrogen levels decline. This becomes vitally important for women in menopausal transition, when preventive measures can significantly improve both the quality and the quantity of their lives^{9,10}

As the age advances the level of estrogen decreases and significantly decreases after menopause, this causes increase in the total cholesterol, LDL-C, but decrease in HDL-C.

Conclusion:

Present study showed significant difference in cholesterol and lipoproteins in younger women in the age group of 20-35yrs and women in the menopausal transition period.

Hence regular monitoring of women in menopausal transition with lipid profile would be helpful to prevent the age related risk of coronary heart disease.

Limitation of study:

Serum estrogen levels have not been estimated.

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