

Incidence of Increased Serum Cholesterol Levels, in the Early Age Postmenopause Women

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ABSTRACT

Objective: To determine changes in serum cholesterol levels in early age postmenopause women.

Methodology: A comparative and cross-sectional study was performed at the department of Physiology B.M.S.I., J.P.M.C., Karachi in collaboration with the Abbassi Shaheed Hospital and National Institute for Cardiovascular Diseases, Karachi. This study included a total of 100 women, 50 with early age post menopause and 50 with normal age post menopause. For the statistical analysis, the degree of probability was computed by comparing the calculated value of "t" with tabulated value in the table of "t" distribution against the degree of freedom.

Results: Serum cholesterol levels were found to be significant with a P-value of <0.05 in the early age post menopause women.

Conclusion: Early age post menopause women are more likely to develop a risk for cardiovascular disorders as they were found to have an increase in the serum cholesterol levels.

Keywords: Early age post menopause. Normal age post menopause. Serum cholesterol levels. Chronic Heart Diseases (CHD). Cardiovascular Disorders(CVD). Cross sectional study.

INTRODUCTION

High serum total cholesterol levels were positively associated with risk of CHD^{1,2,3,4,5}. Ovarian dysfunction at the onset of menopause and increased cardiovascular death incidences are associated with increase in LDL (Low Density Lipoprotein) and decrease in HDL (High Density Lipoprotein) and estradiol. As increased LDL and decreased HDL are associated with cardiovascular disease, the interpretation is that menopausal age may abrogate the protective effects of estrogens on the cardiovascular system⁶.

Lipoproteins play a major role in atherosclerotic process leading to cardiovascular events. Around and after menopause, women experience unfavorable changes in plasma lipids and lipoproteins, i.e., increase in total cholesterol and low density lipoprotein cholesterol (LDL-C)⁷.

In Pakistan, the mean age at menopause has been found to be 49 years (+/-3.6 years) in rural areas and 47 years in urban areas⁹. Menopausal age, is considered to ranges, some as young as 40, other as old as 60. Menopause before 45 years of age is considered to be early age menopause¹⁰.

The interactions between hormones and lipoproteins may participate in maintaining vascular homeostasis¹¹. Earlier age at menopause was

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associated with higher cholesterol levels at age 43 years, increase in cholesterol and blood pressure before menopause, and both increases and decreases with relative weight. Improvements in cholesterol and systolic blood pressure were also associated with a later menopause. A 1% higher 10 year risk for CHD at age 35 years was associated with a decrease in menopausal age of 1.8 years (95% confidence Interval 2.72¹².

Low or absent estrogen and high levels of FSH and LH, is the picture of menopause¹³. Cardiovascular mortality have been found to be greater in women with age at menopause lower than age 45 years as compared to women with later age at menopause¹⁴.

METHODOLOGY

This was a cross sectional and comparative study conducted in the department of B.M.S.I., J.P.M.C. in collaboration with Abbassi Shaheed Hospital and National Institute of Cardiovascular Diseases, Karachi.

A total sample of 100 post menopausal women was selected for the study. 50 women with a history of cessation of menstruation since 2 years, ages between 40–45 years, were selected as early age post menopause. Whereas, 50 women as normal age post menopause consisting of women with a history of cessation of menstruation since 2 years, ages

between 50–58 years. Serum total cholesterol was estimated by the enzymatic colorimetric method. Serum follicle stimulating and serum leutinizing hormones were measured by enzyme linked immunoassay.

The degree of probability was computed by comparing the calculated value of “t” with tabulated value in the table of “t” distribution against the degree of freedom. The difference with mean values of the two groups was regarded as statistically significant, if the P-value was less than 0.05 and it was taken as highly significant if P-value was less than 0.001. Correlation coefficient was detected using Pearson coefficient of correlation SPSS-10. For data feeding the computer package Microsoft Excel was used. Only P-value (<0.05) are considered significant. Non obese, non hypertensive and non hysterectomized women who were experiencing menopause, were included in our study. All the subjects were having normal electrocardiographs, fasting blood sugar under normal limits and hemoglobin \geq 11g/dl. Overall, they were apparently healthy subjects. With history of smoking, any malignancy or psychiatric disorder, were not included in this study. Subjects on hormone replacement therapy and known cardiac patients, were also excluded from this study.

RESULTS

Table 1 shows the comparison of age, height and weight between normal age menopause and early age menopause women. Age was significantly higher in early age menopause (42.08 \pm 0.36 years) than the normal age menopause (53.52 \pm 0.44 years) women, whereas height and weight show no statistical difference.

Table 2 shows comparison of total serum cholesterol between early age menopause group and normal age menopause group. Mean serum cholesterol was significantly higher in early age menopause group (178.82 \pm 8.95mg/dl) than in normal age menopause group (149.82 \pm 8.85mg/dl) with a P-value of <0.05.

Table 3 shows that mean HDL-c was significantly lower in normal age menopause group with a P-value of <0.001 whereas LDL-c was significantly at lower difference in normal age menopause group, in the two groups. The mean FSH was significantly higher in early age menopause group (77.22 \pm 5.16 μ U/ml) as compared to the mean value in normal age menopause group (61.93 \pm 4.15 μ U/ml).

Table 4 shows the correlation of biochemical parameters in the early age menopause group. Serum cholesterol had a strong positive correlation with LDL-c (r =0.738) and a negative correlation with

HDL-c (r=-0.202). LDL-c had a strong negative correlation with serum cholesterol as mentioned above whereas it had a negative correlations with HDL-c (r = -0.191).

Table 5 shows the correlation of biochemical parameters in the normal age menopause group. Serum cholesterol also had a strong positive correlation with LDL-c (r=0.931), but a significant negative correlation was found with HDL-c (r=-0.248). HDL-c had a significant negative correlations with serum cholesterol as mentioned above, whereas, there was a significant negative correlation between HDL-c and LDL-c (r= -0.397).

Table 1: Comparison of age, height and weight in normal age menopause and early age menopause (Mean \pm SEM)

Variables	Normal age menopause	Early age menopause
Age(years)	53.52 \pm 0.44	42.08 \pm 0.36*
Height(Meters)	1.55 \pm 0.007	1.56 \pm 0.008
Weight(kg)	63.52 \pm 1.36	64.30 \pm 1.51

*significant difference at P-value<0.05

Table 2: Comparison of total serum cholesterol in normal age menopause and early age menopause (Mean \pm SEM)

Variables	Normal age menopause	Early age menopause
Total Serum Cholesterol(mg/dl)	149.82 \pm 8.85	178.82 \pm 8.95*

*difference at P-value <0.05

Table 3: Comparison of low and high density lipoproteins, follicle stimulating hormone (FSH) and leutinizing hormone (LH) between normal age menopause and early age menopause (Mean \pm SEM)

Variables	Normal Age Menopause	Early Age Menopause
LDL-c (mg/dl)	77.88 \pm 8.24	85.07 \pm 7.86
HDL-c (mg/dl)	31.58 \pm 1.15**	36.22 \pm 0.696**
FSH(μ U/ml)	61.93 \pm 4.15*	77.22 \pm 5.16*
LH(μ U/ml)	54.74 \pm 3.31	55.36 \pm 4.50

*Sig. difference with P < 0.05 **Sig. difference with P < 0.001

Table 4: Correlation of biochemical parameters when group is early age menopause(EA). (Mean \pm SEM)

	S.Chol	HDL	LDL
S.Chol	r=1	r=-0.202	r=0.738**
HDL	r=-0.202	r=1	r=-0.191
LDL	r=0.738**	r=-0.191	r=1

*Sig. difference with P < 0.05 **Sig. difference with P < 0.001

Table 5: Correlation of biochemical parameters when group is menopause age (MA). (Values are expressed as Mean \pm SEM)

	S. Chol	HDL	LDL
S.Chol	r=1	r=-0.248*	r=0.931**
HDL	r=-0.248*	r=1	r=-0.397*
LDL	r=0.931**	r=-0.397*	r=1

*Sig. difference with P < 0.05 **Sig. difference with P < 0.001

DISCUSSION

According to a national survey, mean total serum cholesterol levels increased from 186mg/dL in 1980 to 200mg/dL in 2000 among men ≥ 30 years of age and from 191 to 208mg/dL among women of the same age. The prevalence of high total cholesterol (≥ 220 mg/dL) increased from 15% to 27% for men and 19% to 35% for women, and that of total cholesterol ≥ 260 mg/dL increased from 2% to 5% for men and from 3% to 8% for women. The increase in total cholesterol levels and prevalence of high total cholesterol was observed primarily between the 1980s and the 1990s and plateaued thereafter⁸.

This study shows the prevalence of high cholesterol levels found in women ≥ 30 years of age with no mentioning of menopausal status.

Highly significance positive correlations were also found between LDL-c and serum cholesterol in both menopausal groups. A significantly positive correlation was also found between HDL-c and LDL-c in normal age menopause group, when compared to the early age menopause group. This is in agreement with the findings of Berg et al (2004)¹⁵.

Our group of early age menopause also had as a significant increase in the serum cholesterol in accordance with the findings of the study done by Knauff et al.(2008)¹⁶.

In our study, follicular stimulating hormone and luteinizing hormones levels were significantly higher in both menopausal groups showing an apparent menopausal status in them whereas these levels were decreased in the reproductive or control group, and these observations are in accordance with the findings of the study done by Barnett et al.(2004)¹⁷.

CONCLUSION

Regarding this comparative and cross-sectional study, we conclude that the increased values for the total serum cholesterol in the early age post menopause group, showing a risk factor for cardiovascular disorders in the early age post menopause women than the naturally occurring normal age post menopause women.

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