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Article · January 2010

DOI: 10.7439/ijbar.v3i8.606

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A STUDY OF ATHEROSCLEROTIC RISK FACTORS IN POSTMENOPAUSAL WOMEN

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Abstract

Background and Objectives: Menopause is a normal ageing phenomenon in women. The risk of cardiovascular diseases gradually increases in postmenopausal women, which may be due to lower level of estrogen. Changes in lipoproteins have been associated with a 30% decline in atherosclerotic cardiovascular disease (ASCVD) risk. This study was designed to compare lipid profile between postmenopausal women and premenopausal women.

Methods: 72 apparently healthy women in the age group of 40-60 years who were attending the OPD of Shri B.M. Patil Medical College Bijapur were randomly selected for the study. They were divided into premenopausal (control) (n=36) and postmenopausal (study)(n=36) group depending upon attainment of menopause. Baseline characteristics such as age and weight were recorded. Total Cholesterol, Serum Triglycerides, Serum High Density Lipoprotein, and Serum Low Density Lipoprotein were estimated using enzymatic methods. Statistical analysis done by using SPSS version 9.0

Results: We found no significant statistical difference in baseline characteristics. Statistically significant higher values of TC, LDL-C, TG levels and statistically significant lower values of HDL cholesterol were found in postmenopausal women compared to premenopausal women.

Conclusion: Serum lipid profile changes to unfavorable lipid profile which is possibly mediated by changing hormonal status after menopause especially estrogen which has role in lipid metabolism, Thus dyslipidemia contributing to increase in cardiovascular disease after menopause.

Keywords: Menopause, lipid profile, ASCVD

1. Introduction

Cardiovascular disease is a leading cause of mortality in men and women in industrialized world. The interactions between the various physiological risk factors for cardiovascular disease are complex; the incidence of cardiovascular disease increases with age in both sexes, but in women the risk increases markedly after menopause.¹

Menopause is defined by The World Health Organization (WHO) as 'the permanent cessation of menstruation as a result of the loss of ovarian activity'². Many physical and mental problems are experienced by women after menopause. Due to increase in life expectancy, and relatively unchanged age at menopause, women are spending more of their life in the post-menopausal period.

The changes in the hormonal status after menopause such as low estrogen, increased luteinizing hormone and follicular stimulating hormone exert significant effect on plasma lipids and lipoproteins metabolism.³

The estradiol level decreases drastically after menopause i.e from 40-350 pg/ml in premenopausal women(reproductive phase) to 13 pg/ml in postmenopausal women(non reproductive phase).⁴ The high estrogen level during reproductive age lowers the LDL-cholesterol by acting on LDL-receptors.⁵

Complimentary effects of Hormone replacement therapy on serum lipids profiles in healthy postmenopausal women also indicate the role of hormones on lipid metabolism in postmenopausal women⁶.

There are many studies done in western population and other parts of Asia regarding the menopausal cardiovascular risk factors. Menopausal health care demanded priority in Indian scenario. Hence the present study was undertaken to study the cardiovascular risk factors in Indian postmenopausal women.

2. Materials and Methods:

72 Apparently healthy women of 40-60 years of age attending BLDEU'S Shri B. M. Patil

Medical College and Hospital Bijapur were randomly selected for the study. They were divided into premenopausal (control) (n=36) and postmenopausal (study)(n=36) groups depending upon attainment of menopause.

Institutional ethical clearance was taken. Informed consent was obtained from all the participants.

Exclusion criteria: Subjects with history of surgical menopause, alcohol intake, clinical signs of structural cardiovascular diseases, receiving drugs known to cause changes in serum lipid profile, Diabetes Mellitus and Hypertension.

Collection of Blood Samples: About 3 ml of fasting blood (minimum 12 hours fasting) was collected by using sterile disposable syringe in dry and clean centrifuge tube taking all

sterile precautions, serum was separated from the clot within 30 minutes and analysed. Serum total cholesterol, HDL-cholesterol, Triglycerides were estimated by enzymatic method.

LDL-cholesterol was determined using Friedewald's Formula

$LDL - cholesterol = Total\ cholesterol - [HDL\ cholesterol + (triglyceride / 5)]$

3. Statistical analysis: Statistical analysis was done using SPSS version 9.

The results are expressed as mean \pm standard deviation. Comparison of lipid profile between premenopausal and postmenopausal women was done using unpaired Student's 't' test. $p < 0.05$ is taken as significant, $p < 0.01$ is taken as highly significant, $p < 0.001$ is taken as very highly significant.

4. Results:

Table 1: Baseline characteristics of Premenopausal and Postmenopausal women

Parameters	Premenopausal women	Postmenopausal women	Level of significance
Age (Years)	42.95 \pm 1.82	46.35 \pm 5.97	0.07
Weight (Kg)	62.22 \pm 8.87	62.72 \pm 9.21	0.81

Table 2: Lipid profile of Premenopausal and Postmenopausal women

Lipid profile parameters	Premenopausal women	Postmenopausal women	Level of significance
Triglyceride(mg/dl)	88.33 \pm 21.99	109.58 \pm 39.49	0.006
Total-cholesterol(mg/dl)	163.5 \pm 20.18	180.13 \pm 28.97	0.006
HDL- cholesterol(mg/dl)	39.63 \pm 5.98	36.75 \pm 5.69	0.03
LDL- cholesterol(mg/dl)	106.52 \pm 18.16	117.72 \pm 26.81	0.04

The table 1 shows the mean, standard deviation and p-value of age and weight of premenopausal & postmenopausal women. There was no significant statistical difference in between mean age and weight of postmenopausal women and premenopausal women.

The table 2 shows the mean, standard deviation and p-value of TC, TG, HDL cholesterol, LDL cholesterol in premenopausal & postmenopausal women. All the lipid profile mean values showed significant statistical difference between both the groups. Serum TC, TG, LDL values were increased and HDL levels decreased in postmenopausal women compared to premenopausal women.

5. Discussion:

In the present study we found menopause is associated with increase in the atherosclerotic risk factors such as total cholesterol, triglycerides, LDL levels and decrease in cardioprotective HDL levels.

Our study is in accordance with Bonithon-Kopp who concluded that total cholesterol and LDL cholesterol significantly increased in postmenopausal women.⁷ Poehlman et al found that the prospective transition to postmenopause was associated with a 16% increase in TG.⁸

Significant increase in triglycerides was observed as that of Bhagya V et al.⁹ Similar findings were also observed by Arunima C et al.¹⁰

Wachara Saranyaratana et al found Hormone therapy in menopausal women can improve

cholesterol levels by decreasing LDL and increasing HDL levels.¹¹

The possible underlying mechanism for changing lipid profile could be decreased estrogen level in postmenopausal women. In premenopausal women the normal levels of estrogen maintains the lipids and lipoproteins in the normal range which may be attributed to its actions such as enhancement of LDL catabolism, presumably due to increased expression of LDL receptors.

Estrogen also increases the HDL levels which may be attributable to increased synthesis with decreased clearance of HDL particles through diminished hepatic lipase activity.¹²

Conclusion:

Menopause results in dyslipidemia which is one of the major risk factor for cardiovascular diseases. The subsequent development of cardiovascular diseases will have a major impact on quality of life of postmenopausal women. Prevention of these diseases is of paramount importance and may involve the measures such as dietary and life style interventions to reduce dyslipidemia which is the major atherosclerotic risk factor in postmenopausal women.

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