EFFECT OF MENOPAUSE ON SERUM HDL-CHOLESTEROL LEVEL

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Background: There is a marked difference in the risk of coronary heart disease between men and women of reproductive age but this gap closes with advancing age. It seems likely that some factors of reproductive physiology are responsible for this. The present study was designed to evaluate the difference in HDL Cholesterol level in premenopausal and postmenopausal women in relation with change of estradiol level.

Methods: Fifty premenopausal and 50 postmenopausal women were included in the study. Estradiol was estimated by radioimmunoassay while HDL-C was estimated by Kit method.

Results: There was a significant (p<0.01) decrease in the HDL-C level of the postmenopausal women (46.72±1.009) as compared with premenopausal women (63.68±1.78).

Conclusion: HDL-C is an independent risk factor for coronary heart disease. This study favours the view that decrease in estradiol level and associated decrease in HDL-C seen in postmenopausal women may be responsible for the increased risk of coronary heart disease after menopause.

Keywords: Menopause; HDL-Cholesterol; Risk factor; Coronary Heart Disease

INTRODUCTION

Coronary heart disease (CHD) is the foremost cause of death in women as well as men, although the onset of CHD is earlier on the average in men

Men and women appear to be equally susceptible to the effects of risk factors such as elevated BP, increased plasma LDL-C and low levels of plasma HDL-C. A lot of difference has been noted in the risk of CHD between men and women of reproductive age. This gap closes with advancing age. It seems likely that some factors of reproductive Physiology are responsible for this.

Oestrogens have a favourable effect on lipid profile, they lower LDL-C and elevate HDL-C. Oestrogens are thought to increase HDL cholesterol by reducing hepatic triglycerides lipase activity that catabolizes HDL.

Menopause is an oestrogen deficient state but unlike other hormone deficient states menopause is not a disease, every women who lives long enough becomes postmenopausal. After menopause the incidence of CHD rises to approach that for men of similar age. This is most probably due to oestrogen deficiency because in young woman where oestrogen production is high serum lipids are normal. But after menopause abnormal lipid levels and increased incidence of coronary heart disease show a possible relationship among oestrogen, normal lipid levels and a relative immunity to CHD.

HDL Cholesterol is a ‘good cholesterol’ and has an inverse relationship with CHD. It has been suggested that transport of cholesterol from peripheral tissues to liver for subsequent catabolism and excretion, is the function of plasma HDL-C. A reduction of plasma HDL-C may impair the normal clearance of cholesterol from arterial wall and thereby accelerate the development of atherosclerosis.

This study was designed to evaluate the effect of oestrogen deficiency due to menopause on serum HDL-total cholesterol level.

MATERIALS AND METHOD

This study was carried out at Department of Biochemistry, Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre, Karachi. The subjects of same weight and height range were randomly selected from women attending different units of Jinnah Postgraduate Medical Centre, Karachi.

Fifty premenopausal and fifty postmenopausal women were included in the study after taking a detailed medical history and observing the exclusion criteria that included the diseases likely to alter lipid profile.

Five ml venous blood was collected from each subject after an overnight fast of 12–14 hours. Serum was separated within one hour of blood collection and stored at -20 °C until analyzed for estradiol and HDL cholesterol.

Serum estradiol was determined by a double antibody radioimmunoassay (RIA) using a gamma-ß-direct estradiol kit cat. No. COD AA-11F1 supplied by immunodiagnostic systems Limited (IDS) UK.

Serum HDL Cholesterol was estimated by using Kit Cat. No. 1001095 supplied by Spinreact S. A. Spain.
The results were subjected to student ‘t-test’ for determining the statistical significance.

RESULTS
The age range was 30-32 years for premenopausal women and 60-62 years for postmenopausal women. The height range was 159-162 cm (5’3”–5’4”) and the weight range was 60-65 kg for both the groups. This height and weight range gave a BMI range of 22.86 to 25.71 kg/m².

The results of this study are summarized in Tables-1, while correlation of age, estradiol and HDL cholesterol are shown in Figure-1.

Table-1: Estradiol and HDL Cholesterol Level in pre and postmenopausal women (Mean±SD)

<table>
<thead>
<tr>
<th>GROUP</th>
<th>MEANAGE (years)</th>
<th>ESTRADIOL (pg/ml)</th>
<th>HDL CHOLESTEROL (mg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premenopausal</td>
<td>32.84±0.95</td>
<td>86.91±9.70</td>
<td>63.68±1.78</td>
</tr>
<tr>
<td>(n=50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postmenopausal</td>
<td>60.12±1.06</td>
<td>11.85±2.26*</td>
<td>46.72±1.009*</td>
</tr>
<tr>
<td>(n=50)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* p<0.001

Figure-1: Relation of increasing age and decreasing estradiol with HDL Cholesterol level

DISCUSSION
Our study showed a highly significant decrease in HDL cholesterol associated with decreased estradiol in postmenopausal women. A number of studies support this finding. Pre-menopausal women are said to be protected against CHD but this protection is lost once the women become post-menopausal. Menopause appears to be associated with adverse changes in blood lipid profile. These changes may enhance the process of atherosclerosis and specially CHD which is the major cause of death and disability in postmenopausal women.

A study by Shabita et al. had suggested a strong association between female hormones and serum lipid metabolism. Among female hormones oestrogen has known beneficial effects on lipid metabolism, so it was taken into account. Among different estrogens estradiol is the most potent oestrogen and is produced almost exclusively by ovaries, so this can be taken as an index of ovarian activity.

Richter et al. had inferred from their study that between ages of 50-70 years mean total cholesterol level in women exceeds those of men. The possible mechanism is that transport of cholesterol from peripheral tissues to the liver for subsequent catabolism and excretion is the function of plasma

HDL-C is reduced after menopause due to oestrogen deficiency. This leads to increased level of total cholesterol in postmenopausal women which in turn increase the incidence of CHD after menopause because total cholesterol is major indicator of risk of CHD in both sexes. For every 10 mg/dl change in HDL-C there is a corresponding 50 % change in CHD risk.

HDL-C can be inferred as a better marker or predictor of risk of CHD in women. It has an inverse association with the incidence of CHD in both men and women.

REFERENCES
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