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Research article

RELATIONSHIP BETWEEN ESTROGEN AND LIPID PROFILE STATUS IN POSTMENOPAUSAL WOMEN

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ABSTRACT: Menopause is the permanent cessation of mensturation due to loss of ovarian follicular function, which results in decreased production of estradiol and other hormones. Decreased levels of estrogen leads to variations in lipid profile leading to atherosclerosis thus by increasing risk of coronary artery disease in post menopausal women. The present study was conducted to evaluate the relationship between serum estradiol and lipid profile status in postmenopausal women to assess risk for coronary artery disease. Study includes 70 subjects, 30 healthy premenopausal women (25-40yrs) and the healthy postmenopausal women in the age group of (55 – 65yrs).Serum estradiol and lipid profile status were estimated in both cases and controls. Reduced estradiol (P0.0001) in post menopausal women and p value is highly significant for total cholesterol, triglycerides, low density lipoproteins. Conclusion: Thus the study outlines that the low levels of estrogen exerts a significant effect on the plasma lipids and lipoprotein metabolism. The risk of coronary artery disease increases in women after menopause.

Key words: TC-total cholesterol, TG-Triglycerides, HDL-High density lipoproteins, LDL-Low density lipoproteins, CHD-coronary heart disease.

INTRODUCTION

Estrogen is mostly secreted by the ovarian follicles and the corpus leteum during pregnancy by the placenta. Decreased levels of estrogen in postmenopausal women leads to variations in lipid profile leading to atherosclerosis there by increasing risk of coronary artery disease in postmenopausal women. The incidence of coronary heart disease have been observed to be increased in postmenopausal women until they become similar to the corresponding rate in men of similar age(Berg A.V, Mesch et al). The hormonal changes associated with menopausae eg: low plasma levels of estrogen and marked increase in leutenising and follicle stimulating hormone levels exert a significant effect on the metabolism of plasma lipids and lipoproteins (Sacks F.M, A.M. Murray et al).

The behavior of lipoporteins during the menopausal transition and their relationship with the sex hormones and estrogens are thought to increase HDLC by reducing hepatic TG lipase activity that catabolizes HDL, atherogenic alteration in lipid and lipoprotein profiles have been found by studies of surgically induced menopause (Gy,AD Blann et al 1997), and epidemiological studies comparing premenopausal women with menopausal and postmenopausal women(Bouthon Kopp et al 1990). Deposition of fatty plaques on arterial walls is a predisposing factor for CHD (Kannel W.B 1987). Variation in the distribution of serum lipids and lipoproteins have been implicated in the eitiology of atherosclerosis and cardiovascular disease. The effect of the hormonal changes associated with menopause on the serum lipid levels play important role in most cardiac related disorder associated with menopause (Do.K.AA, Green et al). Estrogen have a favourable effect on lipid profile, they lower LDL-C and elevated HDL-C (Norin Sultan, Mohammad Nawaz et al 1998). The aim of the study is to evaluate the effect of estradiol on lipid levels in postmenopausal women and assess the risk of coronary artery disease in these women.

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MATERIAL AND METHODS

The study was conducted in patients attending outpatient department in gynecologly department in Narayana Medical College, Nellore. A total number of 70 subjects participated in the present study 30 healthy premenopausal women volunteer (25- 40 yrs) and 40 healthy postmenopausal women in age group of (55-65yrs) were participated. 5ml of venous blood was collected aseptically form antecubital vein after 12 hours fasting and serum was separated by centrifugation and serum was separated by centrifugation and analyzed or stored at 2-8°C in plain tubes. Serum estradiol was estimated by direct immune enzymatic assay (Chinyera Adanna opara usoro 2007) (Beck Jensen Je, Kollereu P.G 1997) in both cases and controls.

Similarly estimation of cholestrol was done by cholesterol oxidase–peroxidase method (Jacob S N.1960) (Koditschek L.K 1969)(Okada 1998) estimation of triglycerides was done by glycerol 3-phosphate oxidase peroxidase method(Gordan T et al 1977) (Izawa S et al). And the estimationof LDL cholesterol was done by enzymatic colorimetic test (Gore. Langton 1988)(Hall P.F, 1976)(MC Nastty K.P et al 1976) and direct homogenous test for the determination of HDL-cholestrol enzymatic colorimetric test (Jenner M.R 1982)(Carr M.C 1998).

The above procedures were adopted for both cases and controls.

RESULTS

The results were expressed in terms of mean ± standard deviation (S.D). The p value <0.05 was considered as significant.

Within a study group relationship between estradiol and lipid profile was assessed using pearson's correlation test with p value <0.05 as significant limit. Table 1 and Figure 1 shows the comparison of lipid profiles in cases and controls. In table 2 and Figure 2 shows the comparison of estradiol in cases and controls expressed in bar diagrams.

Table III shows correlation between estrogen and lipids and figure III shows the correlation between estrogen and HDL and figure IV show the correlation between estrogen and LDL as scattered diagram.

Table 1: Comparison of Lipid profiles in cases (post menopausal) and controls (pre menopausal)

Parameters	Cases n = 40(post mw)	Control n = 30 (pre mw)	P value	T value
T.Chol	174.72±39.00	149.03±28.78	0.003	3.038
TG	127.05±51.08	65.76±18.50	0.0001	6.260
HDL	32.57±1193	43.20±8.86	0.0001	4.097
LDL	121.37±33.37	93.60±21.38	0.0002	3.982

The Mean values of the parameters except HDL were higher in cases compared to controls. The P value is highly significant per total cholesterol triglycerides and LDL.

Table : 2 Comparision of Estradiol Levels between cases (post menopausal)and Controls (pre menopausal) pg/ml

Parameters	Cases n = 40 (post mw)	Control n = 30(pre mw)	P value	T value
Oestradiol	39.33±13.36	73.76±36.20	0.0001	5.543

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Figure: 1: Comparison of Lipid profiles in cases (post menopausal) and controls (pre menopausal)

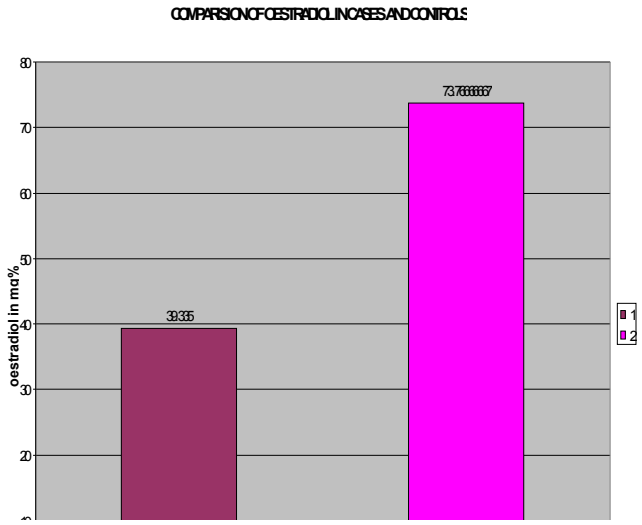

Figure :2: Comparision of Estradiol Levels between cases (post menopausal)and Controls (pre menopausal) pg/ml

Table 2 shows the mean serum estradiol in cases (post menopausal) and controls (pre menopausal) are 39.33±13.36 and 73.76±36.20 respectively P value 0.0001. There is highly significant elevation in estradiol levels in post menopausal in comparison with pre menopausal women.

Table: 3 CORRELATION BETWEEN ESTROGEN AND LIPIDS Controls (pre menopausal) **(n = 30)**

Parameter	Correlation coefficient	P value
Total cholesterol	**0.51**	**0.003**
TG	**-0.02**	**0.91**
HDL	**0.49**	**0.005**
LDL	**0.53**	**0.02**

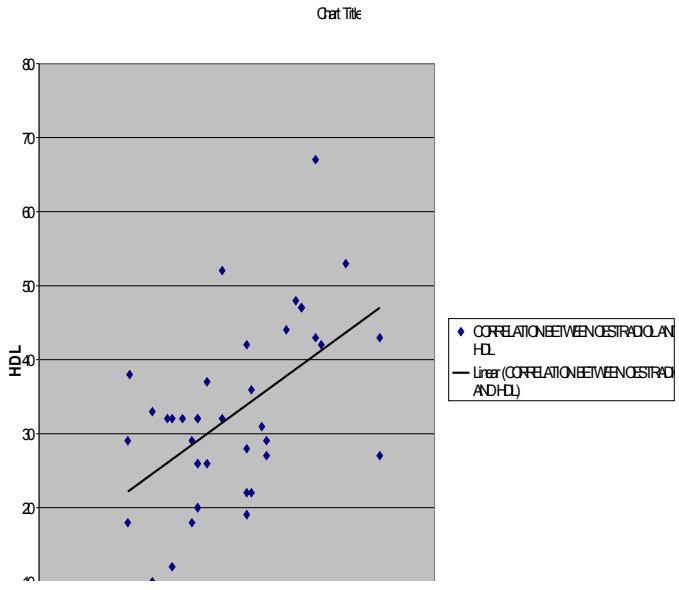

Figure : 3 : Scattered diagram showing correlation between Oestradiol and HDL in post meno pausal women

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1. Correlation coefficient of oestradiol and HDL in case: 0.54687098. There is considerable or significant correlation. p=0.0003

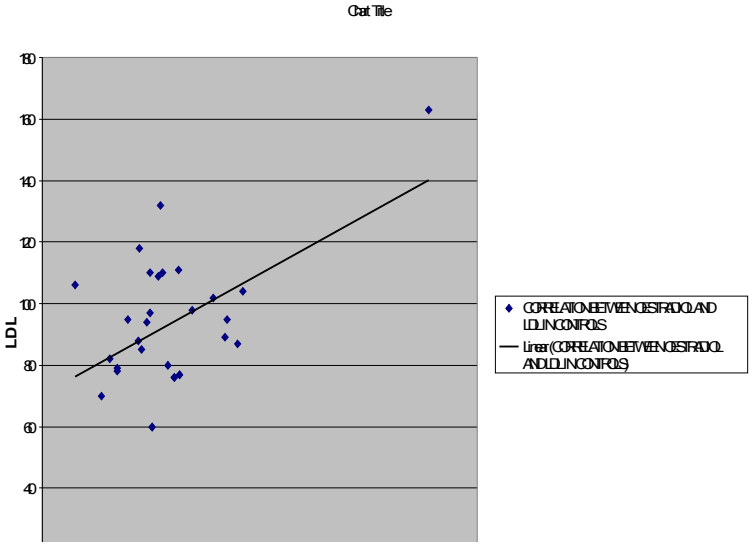

Figure : 4 : Scattered diagram showing correlation between Oestradiol and LDL in Controls(pre menopausal women)

2. Correlation coefficient of oestradiol and LDL in controls: 0.5309348. There is considerable or significant correlation. p=0.0025

DISCUSSION

The risk of coronary artery disease increase in women after menopause. This increased risk may be associated with alteration in the lipid profile characterized by changes in low density lipoprotein particle size and buoyancy (Carr M.C 1998). Lipid oxidation plays a central role in the pathogenesis of atherosclerosis and it may also promote osteoporosis (Aydeniz Ali 2006). Low density lipoprotein has been implicated in the development of coronary heart disease.

In our present study mean values of serum estradiol in cases was 39.33 ± 13.36 pg/ml and in controls it was 73.76 ± 36.20 respectively which is highly significant (p value <0.001). There is decrease in serum estradiol levels in postmenopausal women when compared to premenpausal women (Raann en H.K 1996). Similarly there is a negative correlation between serum estradiol and serum total cholesterol in postmenopausal women (C.A.O Usoro 2006). Suggesting that estrogen deficiency increases serum total cholesterol and vice versa. In the same manner serum HDL, LDL, TG were compared between postmenopausal women and premenopausal women.

We found that there is decrease in HDL levels in postmenopausal women that in premenopausal women which is highly significant (Berg A.A Mesch). There is a negative correlation between estradiol and LDL values in postmenopausal women (Berg A.AMesch). Similarly there is a negative correlation between estrodial and serum triglycerides (C.A.O Usoro 2006).

Hence present study supports the view that the elevated TC,LDL, TG in postmeopausal women greater than 45 years have been attributed to hormone changes and failure of follicular development, where the plasma estradiol levels that reduce the risk of coronary heart disease falls below the levels seen in premenopausal women(Sarrel P.M 1990). Which predisposes for atherosclerosis.

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