A Comparative Study of Serum Lipid Profile between Premenopausal And Postmenopausal Women.

Dr.Maulik S. Varu[*], Dr.Anup M. Vegad[*], Dr. Hitesh A. Jani[**], Dr.Chirag V. Savalia[***], Dr.Varsha S. Joshi[****]

[*] Assistant Professor, Department of Physiology, Govt Medical College, Bhavnagar, 364001 [**] Assistant Professor , Department of Physiology, M. P. Shah Medical College, Jamnagar, 361008 [***] Assistant Professor , Department of Physiology, P. D. U. Medical College, Rajkot, 360001 [****] Professor & Head, Department of Physiology, M. P. Shah Medical College, Jamnagar, 361008 Gujarat

Abstract: Background & objectives: The effect of the hormonal changes associated with menopause on the serum lipid levels may play an important role in most cardiac related disorders associated with menopause. So the present study was undertaken with the following objectives. 1) To study the serum lipid profile in premenopausal and postmenopausal women. 2) To compare the differences of serum lipid profile between premenopausal and postmenopausal women. 3) To study the effect of duration of menopause on serum lipid profile. 4) To correlate the results of present study with that of other studies. Methods: 50 premenopausal and 50 postmenopausal women were recruited for the study. The subjects having risk factors that may affect the lipid profile were excluded. 5 ml of venous blood was collected after overnight fasting of 12 hrs in all the subjects for estimation of serum levels of total cholesterol, HDL, LDL, VLDL and triglycerides. Results: As compared to premenopausal women, mean level of serum total cholesterol and serum LDL were significantly higher in postmenopausal women and level significantly increased with increase in the duration of menopause. While level of serum HDL was significantly lower in postmenopausal women and level significantly decreased with increase in the duration of menopause. There was no statistically significant difference in serum triglycerides and serum VLDL between premenopausal and postmenopausal women up to 10 years duration of menopause. However they increased significantly after > 10 years duration of menopause. Interpretation & conclusion: According to the present study, menopause is associated with altered serum lipid profile and thus an independent risk factor for developing cardiovascular diseases. Therefore it is important to consider each and every postmenopausal woman to undergo screening for abnormal lipid profile. In them, specific health education strategies are needed in an order to prevent the emerging cardiovascular diseases.
[Varu M et al NJIRM 2012; 3(1) : 43-45]

Key Words: Serum lipid profile, Premenopausal women, Postmenopausal women.

Author for correspondence: Dr. Maulik S. Varu, Department of Physiology, Govt. Medical College, Bhavnagar, Gujarat 364001. E- mail: drmaulikvaru@yahoo.com

Introduction: Menopause means permanent cessation of menstruation at the end of reproductive life due to loss of ovarian follicular activity[1] .The effect of the hormonal changes associated with menopause on the serum lipid levels play important role in most cardiac related disorders associated with menopause[2]. Up to the age of 50 years, the prevalence of coronary artery disease (CAD) among women is lower than among men, but the incidence rises significantly after the menopause. The incidences of coronary heart disease have been observed to be increased in postmenopausal women until they become similar to the corresponding rates in men of similar age[3]. Multiple risk factors have been identified as contributory to the development of CAD. Hypercholesterolemia is a key factor in the pathophysiology of atherosclerosis[4]. After menopause, there is loss of ovarian function. This results in adverse changes in glucose and insulin metabolism, body fat distribution, coagulation, fibrinolysis, vascular endothelial dysfunction and also derangement of lipoprotein profile. Lack of estrogen is an essential factor in this mechanism[5, 6]. Atherogenic alterations in lipid and lipoprotein profiles have been found in studies of surgically induced menopause and epidemiological studies comparing premenopausal women with postmenopausal women[7]. Whether dyslipidemia leads to significant increase in the development of coronary artery disease (CAD) is still controversial, more so in our environment where little work has been done. The behaviour of lipoproteins during the menopausal transition and their relationship with the sex hormones and body fat distribution is still unclear[3]. The present study is aimed at

comparing the serum level of total cholesterol, triglycerides, high density lipoprotein (HDL), low density lipoprotein (LDL) and very low density lipoprotein (VLDL) between premenopausal and postmenopausal women.

Material and Methods: The study was carried out in department of Physiology, Shri M. P. Shah Medical College and Guru Gobind Singh Government Hospital (GGGH), Jamnagar during period from January 2009 to March 2010. After taking institutional ethical committee approval, fifty premenopausal and fifty postmenopausal women were recruited for the study. So total hundred women aged between 21-75 years were selected for the study. All the subjects in both the samples were apparently healthy. The subjects having risk factors that may affect the lipid profile like smoking, alcoholism, obesity, diabetes mellitus, hypertension, renal failure, nephrotic syndrome, hypothyroidism, liver disease, drug history like estrogen, progesterone, β blocker, steroids etc were excluded.

After taking consent, their detailed history was taken, general and systemic examinations were done thoroughly. 5 ml of venous blood was collected after overnight fasting of 12 hrs in all the subjects. Estimation of serum levels of total cholesterol, HDL, LDL, VLDL and triglycerides was done by end point colorimetry.[9] Results were obtained in mg/dl and converted into mmol/ L by using appropriate conversion factor since mmol/L is SI (Standard International) unit and also for the purpose of comparison with the other studies in which data are available in mmol/L. Statistical analysis was carried out by applying unpaired-t test.

Results: The study was carried out on 50 premenopausal and 50 postmenopausal women and showed following results:-

General examination and systemic examination of all the subjects were normal. Premenopausal women were from the age group 21-45 years with mean age of 33.38 years. Postmenopausal women were from the age group 51-75 years with mean age of 61.7 years.

Table: 1 Serum lipid profile in premenopausal and postmenopausal women.

Lipid type	Premenopausal (mmol/L)	Postmenopausal (mmol/L)	P value
Serum total cholesterol	3.86 ± 0.61	4.97 ± 0.99	< 0.05*
Serum HDL	1.49 ± 0.14	1.30 ± 0.17	< 0.05*
Serum LDL	2.08 ± 0.65	3.37 ± 1.08	< 0.05*
Serum triglycerides	1.41 ± 0.28	1.47 ± 0.28	> 0.05
Serum VLDL	0.28 ± 0.06	0.29 ± 0.05	> 0.05

* Statistically significant

Table:2 : Comparison of serum lipid profile of premenopausal women with that of postmenopausal women having various durations of menopause showing effect of duration of menopause on lipid profile.

Lipid type (mmol/L)	Premenopausal Women	Postmenopausal women (Duration of menopause)					
		1-5 years		6-10 years		> 10 years	
		Level	P value	Level	P value	Level	P value
Serum total Cholesterol	3.86 ± 0.61	4.21 ± 0.44	< 0.05*	5.23 ± 0.55	< 0.05*	6.10 ± 0.98	< 0.05*
Serum HDL	1.49 ± 0.14	1.41 ± 0.09	< 0.05*	1.29 ± 0.09	< 0.05*	1.12 ± 0.18	< 0.05*
Serum LDL	2.08 ± 0.65	2.54 ± 0.45	< 0.05*	3.65 ± 0.54	< 0.05*	4.62 ± 1.07	< 0.05*
Serum Triglycerides	1.41 ± 0.28	1.32 ± 0.13	> 0.05	1.44 ± 0.21	> 0.05	1.81 ± 0.28	< 0.05*
Serum VLDL	0.28 ± 0.06	0.26 ± 0.02	> 0.05	0.29 ± 0.04	> 0.05	0.36 ± 0.05	< 0.05*

* Statistically significant

Discussion: As compared to premenopausal women, mean level of total serum cholesterol and serum LDL were significantly higher in postmenopausal women and level significantly increased with increase in the duration of menopause. While level of serum HDL was significantly lower in postmenopausal women and level significantly decreased with increase in the duration of menopause. There was no statistically significant difference in serum triglycerides and serum VLDL between premenopausal and postmenopausal women up to 10 years duration of menopause. However they both increased

significantly after > 10 years duration of menopause.

Since factors affecting serum lipid profile were excluded, these changes may be related to deficiency of estrogen occurring after menopause.

The present study correlates well with results of C.A.O.Usoro et al.[8] Who fond statistically significant increase in serum total cholesterol and serum LDL and statistically significant decrease in serum HDL after menopause. The present study also correlates with results of J.C.Igweh et al.[4] who found statistically significant increase in serum LDL and statistically significant decrease in serum HDL after menopause. They also found statistically significant increase in serum VLDL which correlates with the present study only after 10 years of menopause. However they did not found statistically significant increase in serum total cholesterol after menopause as in the present study. This may be related to difference of sample size.

Table: 3: Comparison of present study with other similar studies.

Lipid type	Present study			C.A.O.Usoro et al.[8]			J.C.Igweh et al.[4]		
	Premenopausal women (n=50)	Postmenopausal women (n=50)	P value	Premenopausal women (n=43)	Postmenopausal women (n=51)	P value	Premenopausal women (n=74)	Postmenopausal women (n=56)	P value
Serum total cholesterol	3.86 ± 0.61	4.97 ± 0.99	< 0.05*	3.78 ± 1.03	5.00 ± 1.28	< 0.05*	4.30 ± 0.68	4.51 ± 0.74	> 0.05
Serum HDL	1.49 ± 0.14	1.30 ± 0.17	< 0.05*	1.55 ± 0.59	1.24 ± 0.43	< 0.05*	1.37 ± 0.02	1.23 ± 0.21	< 0.05*
Serum LDL	2.08 ± 0.65	3.37 ± 1.08	< 0.05*	1.57 ± 1.00	3.12 ± 1.35	< 0.05*	2.70 ± 0.74	3.03 ± 0.69	< 0.05*
Serum triglycerides	1.41 ± 0.28	1.47 ± 0.28	> 0.05	1.44 ± 0.62	1.42 ± 0.57	> 0.05	1.12 ± 0.43	1.30 ± 0.73	> 0.05
Serum VLDL	0.28 ± 0.06	0.29 ± 0.05	> 0.05	0.65 ± 0.28	0.67 ± 0.26	> 0.05	0.28 ± 0.04	0.25 ± 0.04	< 0.05*

* Statistically significant

Conclusion: According to the present study, menopause is associated with altered serum lipid profile and thus an independent risk factor for developing cardiovascular diseases. Therefore it is important to consider each and every postmenopausal woman to undergo screening for abnormal lipid profile. In postmenopausal women, specific health education strategies are needed in an order to prevent the emerging cardiovascular diseases.

Limitation of study: The present study does not show the exact cause of altered serum lipid profile after menopause. However inclusion of estrogen level measurement may help.

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