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Estimation of Serum Lipid Profile among Pre and Post-Menopausal Women in Baghdad City

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Abstract

This study aimed to determine the lipid profile concentration in the sera of women before and after the menopausal age in Baghdad city, since it is one of the main causes of cardiovascular diseases. The study included 100 women (40 premenopausal women with their ages ranged between (25-45 years) and 60 postmenopausal women with their ages ranged between (50-65 years). Blood samples were collected and total serum cholesterol (TC), S. triglycerides (TG), S. high density lipoprotein (HDL),S. low density lipoprotein (LDL) and S. very low density lipoprotein (VLDL) were measured. The results showed no significant difference ($P>0.05$) in the level of total cholesterol (TC) between the two groups of women, while there was a statistically significant increase ($P<0.05$) in the level of serum triglyceride (TG) in postmenopausal women (144.32±43.16) mg/dl when comparison with premenopausal women (101.92±32.44) mg/dl, and a significant decrease ($P<0.05$) in HDL level in postmenopausal women (33.56±10.65) mg/dl when compared with premenopausal women (43.13±14.23) mg/dl. The results of LDL level also showed a significant increase ($P<0.05$) in postmenopausal women (107.57±21.28) mg/dl when compared with premenopausal women (77.23±30.40) mg/dl, and a significant increase ($P<0.05$) in VLDL level in postmenopausal women (31.86±8.16) mg/dl when compared with premenopausal women (21.32±7.12) mg/dl.

Key words:-*dyslipidemia, postmenopausal, premenopausal, lipid profile.*

Introduction

Menopause is the period of absence of the menstrual cycle for more than six months, and it is a natural phenomenon that occurs in all women and represents a transition from the age of fertility to the stage of inability to reproduce (childbearing). It is often caused by the termination of ovarian eggs, and thus ovaries stop producing estrogen hormone, and this stage is accompanied by many symptoms that vary in severity between one woman and another [1] . Women often reach the menopausal age gradually, where the menstrual cycle becomes irregular in the year before the menopausal age, where the menstrual cycle occurs frequently and then begins spacing every two months or more, but sometimes women reach the menopausal age suddenly where the menstrual cycle stops suddenly after months or years of regular cycles [2] . The menopausal age period is of two types: the first period is the premenopausal, which represents the reproductive period, i.e before the absence of the menstrual cycle [3], while the second type is the post menopause, which is the period of the woman's life that comes after the last menstrual cycle, where the ovaries stop functioning for whatever reasons whether natural or pathological [4]. Hyperlipidemia is a major cause of cardiovascular diseases and is the most common cause of death for females after the menopausal age [5].

Cholesterol is an organic molecule found in food, and can be absorbed slowly from the digestive system. It plays a vital role and found in the membranes of all eukaryotic cells [6]. While LDL carries the largest part of cholesterol and represents the bad cholesterol. Cholesterol is carried in blood by low density lipoproteins. LDL carries cholesterol from liver to tissues, and represents cholesterol ester-containing globular particles. HDL is the good cholesterol which carries cholesterol from the vessels to the liver to get rid of it, thereby it prevents cholesterol precipitation on the walls of the arteries [7]. Triglycerides act as essential sources of energy in the body. They are organic compounds composed of glycerol bound to three fatty acids. Triglycerides move in blood and stored in fatty cells. Triglycerides have

an important function in the body, since they provide the body with activity and energy. Studies have shown a link between triglycerides and heart diseases [8], and even most studies indicated the risk of triglycerides increase on cardiovascular diseases [9]. The current study aimed to estimate the lipid profile levels in the sera of postmenopausal age women and compare them with the premenopausal age women.

Materials and Method

This study was performed on randomly-selected healthy women before and after menopausal age who visited Baghdad teaching hospital and some health care centers in Baghdad city during the period from (October 2017 to February 2018).

After blood sample collection, laboratory tests were performed on the study groups which included 100 women (40 premenopausal women with their ages ranged between (25-45) years and 60 postmenopausal women with their ages ranged between (50-65 years). Data on age, weight, life style, demographic and menopausal status were recorded precisely in a questionnaire form for each of the study samples, who were selected according to selection and investigation criteria. Women with dyslipidemia, Diabetes mellitus, hypertension, kidney diseases, cardiovascular diseases, acute infections, liver diseases and other chronic diseases were excluded from our study.

Serum levels of cholesterol, triglycerides, HDL, LDL and VLDL were estimated by enzymatic method. Data obtained from our study were analyzed using the SPSS program according to the (T-test) by which means and standard deviations were obtained, and ($P<0.05$) was counted as significant while ($P<0.01$) was counted as a highly significant.

Results and Discussion

In this study, the lipid profile concentration including total serum cholesterol (TC), S. triglycerides (TG), S. high density lipoprotein (HDL), S. low density lipoprotein (LDL) and S. very low density lipoprotein (VLDL) were estimated for women before and after the menopausal age. The study included 100 women (40 pre-menopausal women with their ages ranged between (25-45) years and 60 post-menopausal women with their ages ranged between (50-65) years.

Results in table and figure (1) showed an increase in the level of lipids in the sera of pre-menopausal women in comparison with their levels in the sera of pre-menopausal women. There was a remarkable but non-significant increase in serum total cholesterol level among post-menopausal women (167.63±43.16) mg/dl when compared with its levels among pre-menopausal women (138.85±38.31) mg/dl.

There was a statistically significant elevation ($P<0.05$) in the level of serum triglyceride (TG) among post-menopausal women (144.32±43.16) mg/dl as compared with pre-menopausal women (101.92±32.44) mg/dl, and a significant decrease ($P<0.05$) in HDL level in post-menopausal women (33.56±10.65) mg/dl when compared with premenopausal women (43.13±14.23) mg/dl. The results of LDL level also showed a significant increase ($P<0.05$) in post-menopausal women (107.57±21.28) mg/dl when compared with pre-menopausal women (77.23±30.40) mg/dl, and a significant increase ($P<0.05$) in VLDL level in post-menopausal women (31.86±8.16) mg/dl when compared with pre-menopausal women (21.32±7.12) mg/dl.

Table (1): Lipid profile levels in pre and postmenopausal age women

Lipid profile	Mean ±SD (mg/dl)	
	Premenopausal women (25-45) years	Postmenopausal women more (50-65) years
S.TC	138.85±38.31	167.63±43.16 Ns
S.TG	101.92±32.44	144.32±43.16**
S.HDL	43.13±14.23	33.56±10.65*
S.LDL	77.23±30.40	107.57±21.28*
S.VLDL	21.32±7.12)	31.86±8.16*

TC(total cholesterol). TG (triglyceride), HDL (high density lipoprotein), LDL (low density lipoprotein), VLDL (very low density lipoprotein).

** Highly significant $P\leq0.01$, * Significant $P\leq0.05$, Ns: No significant.

Results obtained from our study regarding cholesterol levels agreed with other studies such as Igweh et al [10], who found a non-significant increase $P>0.05$ in total cholesterol levels. Our results also were in agreement with Fatma et al [11],who demonstrated a

non-significant increase in cholesterol levels.

Our findings were consistent with the study conducted by Swapnali et al, who indicated a significant increase in the mean levels of TG, LDL-C and VLDL-C during the postmenopausal age, and a significant decrease in the mean levels of HDL-C in postmenopausal age women in comparison with its levels in premenopausal women, while their results regarding TC levels did not agree with our findings when they found a significant increase ($p<0.05$) in TC levels in postmenopausal age [12].

Our current results disagreed with those of Kalavathi et al and Muzzio et al who found a significant increase in TC levels in the postmenopausal age due to estrogen hormone deficiency after the menopausal age [13,14].

In a study conducted by Kanwar et al, it was shown that the mean and standard deviation differences of TG were non-significant between the pre and postmenopausal women, with a significant decrease in VLDL-C levels ($P<0.05$) in postmenopausal age women in comparison with the premenopausal women. However, their results agreed with our findings in regard to HDL-C and LDL-C and TC [15].

Table (2): Lipid profile levels in premenopausal age women

Lipid profile	Mean ±SD (mg/dl)		P value
	Premenopausal women 25-34 years	Premenopausal women more than 35-44 years	
S.TC	146.04±48.05	128.95±32.59	NS
S.TG	109.65±42.06	95.23±22.59	
S.HDL	43.05±18.02	44.48±11.96	
S.LDL	82.50±32.16	64.49±28.09	
S.VLDL	23.02±9.23	17.96±4.92	

TC(total cholesterol). TG (triglyceride), HDL(high density lipoprotein), LDL (low density lipoprotein), VLDL (very low density lipoprotein).

Table (3): Lipid profile levels in postmenopausal age women

Lipid profile	Mean ±SD (mg/dl)		P value
	Postmenopausal women 50-59 years	Postmenopausal women more than 60-65 years	
S.TC	156.95±38.75	176.23±23	NS
S.TG	138.23±35.43	148.15±35.85	
S.HDL	35.68±10.96	34.5±8.73	
S.LDL	93.92±19.04	117.02±27.82	
S.VLDL	26.85±6.87	28.98±7.01	

TC (total cholesterol). TG (triglyceride), HDL (high density lipoprotein), LDL (low density lipoprotein), VLDL (very low density lipoprotein).

The premenopausal age women group (40 samples) whose ages ranged between (25-45) years was also subdivided into two groups: the first group (25) women whose ages ranged between (25-34) years, and second group (15) women whose ages ranged between (35-44) years.

There was a very little and non-significant increase (P>0.05) in the levels of TC, TG, HDL, LDL and VLDL among the second group of women at premenopausal age whose ages ranged between (35-44) years (146.04±48.05), (109.65±42.06), (43.05±18.02), (82.50±32.16), and (23.02±9.23) mg/dl respectively when compared with their levels among the first group of premenopausal age women (128.95±32.59), (95.23±22.59), (44.48±11.96), (64.49±28.09) and (17.96±4.92) mg/dl respectively as shown in table (2).

While the postmenopausal age women group (60 samples) whose ages ranged between (50-65) years were also subdivided into two groups: the first group (40) women whose ages ranged between (50-59) years, and second group (20) women whose ages ranged between (60-65) years.

There was a little and non-significant increase (P>0.05) in the levels of TC, TG, HDL, LDL and VLDL among the second group of women at postmenopausal age whose ages ranged between (60-65) years (176.23±23), (148.15±35.85), (34.5±8.73), (117.02±27.82) and (28.98±7.01) mg/dl respectively when compared with their levels among the first group of postmenopausal age women whose ages ranged between (50-59) years (156.95±38.75), (138.23±35.43), (35.68±10.96), (93.92±19.04) and (26.85±6.87) mg/dl respectively as shown in table (3).

The study performed by poonam, showed coincident results with our findings as they found no change in TC levels between the pre and postmenopausal age women [16].

Results obtained by Yassin et al were in agreement with our results regarding HDL and LDL levels, while their results did not agree with ours regarding TC and TG [17].

Our findings also agreed with those of Anthony et al in regard to TC, HDL, TG and VLDL, while they did not agree with us in regard to LDL levels [18].

It is worth mentioning that the absolute value of total cholesterol is not the most important factor to identify cardiovascular diseases, but the abnormal levels of the cholesterol types TG, HDL-C and LDL-C are the most important factors in such disease, and this is attributed to the variation in races and genetic types as well as other interfering factors. The values of lipid profile obtained in our study match with women in Baghdad city with all the similar statistical differences of the racial and genetic variations in other parts of the world. It is estimated that an increase of 1 mg/dl in HDL-C level leads to a 3% reduction in the risk of the coronary artery diseases and a 4.7% reduction in the risk of death and cardiovascular diseases [19]. In our study, the level of HDL-C decreased, while the level of LDL-C increased, which is a great and important indicator of cardiovascular disease development, and this finding was reported by many studies [20].

Undoubtedly, the postmenopausal changes in lipid profile levels in our study are unhealthy changes and can be harmful to the cardiovascular system.

Conclusion

Menopause causes lipid profile alteration through increasing the levels of Tc , TGs, LDL, VLDL. Therefore the risk of cardiovascular disease will be higher. Post-menopausal women are always at highly risk of cardiovascular disease development, due to the change in their lipid pattern and loss of estrogen effect in protecting the cardiovascular system.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Institute of Medical Technology/ Baghdad/ Nursing Department, Iraq and all experiments were carried out in accordance with approved guidelines.

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