Article

Lipid Profile Status In Surgical Menopause

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Abstract

Background: Dyslipidaemia in both surgical and natural menopausal women is a common health hazard all over the world. Moreover, the surgical menopausal women may have greater chance of this disorder than those of natural menopausal women. **Objective:** To observe lipid profile level in surgical menopausal women in Bangladesh. **Methods:** This cross sectional study was carried out in the Department of Physiology, Sir Salimullah Medical College, Dhaka from 1st January 2010 to 31st December 2010. A total number of 90 female subjects were included in this study. They were divided into control and study groups. Among them 6o women were taken as control (30 premenopausal women- group A and 30 natural menopausal women -group B) and 30 were taken as study (surgical menopausal-group C).However, age range of premanopausal women were from 30-35 years, natural menopausal women from 50-60 years and surgical menopausal women from 45-55 years. All the menopausal women were selected from Out Patient Department (OPD) of Gynaecology and Obstetrics of Sir Salimullah Medical College and Mitford Hospital. Premenopausal women were selected by personal contact. Serum lipid profile and serum estrogen levels of all participants were estimated by enzymatic method and by AxSYM method respectively. The statistical analysis was done by using appropriate method as applicable. **Results:** In this study, mean serum triglyceride (TG) level was significantly ($p<0.05$) higher and serum high density lipoprotein cholesterol (HDL-C) level was significantly ($p<0.001$) lower in surgical menopausal women than those of natural menopausal women. . Again, mean serum estrogen level was significantly ($p<0.001$) lower in surgical menopausal women than that of natural menopausal women. **Conclusion:** The present study revealed that surgical menopausal women have greater chance of dyslipidaemia than those of natural menopausal women.

Key words: Menopause, surgical menopause, dyslipidaemia.

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Introduction

Menopause is an event that includes the changes caused by the end of reproductive period and the consequence of these changes in the body [1]. Menopause may occur physiologically or artificially. The natural menopause occurs usually between the ages of 45 to 52 years. Whereas, surgical menopause i,e hysterectomy with bilateral ooporectomy is performed due to different pathological causes before natural menopause[2]. Menopause, whether it occurs naturally or surgically, is characterized by the reduced production of hormones by the ovaries [3].There are major changes in estrogen, progesterone, androgen and gonadotropin levels which may be due to ceassation of ovarian follicular activity [4].

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Lipid profile abnormalities in the menopausal women are common health hazard all over the world. There is derangement of lipoproteins profile independent of age [5]. Menopausal women have higher plasma levels of total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), very low density lipoprotein cholesterol (VLDL-C) and triglyceride (TG) when compared with premenopausal women [6].

Hypercholesterolemia is a key factor in the development of atherosclerosis [7] .A number of changes that occur in the lipid profile after menopause are associated with increased risk of atherosclerosis, coronary heart disease and myocardial infarction may be due to lack of estrogen[8] . Ovarian estrogen seems to be inversely related to the development of cardiovascular disease and elevated serum lipid levels [9] .

A stronger relationship was found between cardiovascular disease morbidity, mortality and surgical menopausal women [10] . Some researchers reported that the rate of metabolic syndrome (hypertension, hyperglycemia and dyslipidaemia) was higher in surgical menopausal women than that of natural menopausal women[3]. Again, risk factors for cardiovascular disease morbidity and mortality such as dyslipidaemia, glucose intolerance and hypertension appear more slowly in natural menopausal women [10]. It has also been suggested that estrogen level drops abruptly in women with bilateral oophorectomy whereas gradually in natural menopausal women[11]. Hysterectomy alone can not increase risk of cardiovascular disease, but hysterectomy may lead to subsequent ovarian failure [10] . After the age of 50 years, the risk of myocardial infarction increases among the oophorectomized women, compared with women who retain their ovaries [12] . However, after natural menopause, ovaries continue to produce significant amount of androgens, which are converted to estrogen peripherally [13] .

Some investigators observed that hysterectomy with bilateral oophorectomized women had higher level of TG and TC than those of natural menopausal women[14]. Again, surgically menopausal women had higher level of LDL-C than that of natural menopausal women[15]. Recently it has also been observed that HDL level was significantly lower and VLDL level was significantly higher in surgically menopausal women than those of natural menopausal women[16].

Surgical menopause was found to be strongly associated with postmenopausal syndrome and dyslipidaemia than those of natural menopausal women. Postmenopausal syndrome and its complication in Bangladeshi women are increasing with time. Although recently some studies have been done on dyslipidaemia in menopausal women in our country [17] . But little is known about the risk of lipid profile abnormalities in surgical menopausal women. Therefore, the present study has been undertaken to observe and compare the changes in lipid profile status between the surgical and natural menopausal women in Bangladesh. It is expected that the findings of the study would give a guideline to the physician for early detection and better management of this changes in both types of menopausal women in order to improve their quality of life.

Methods

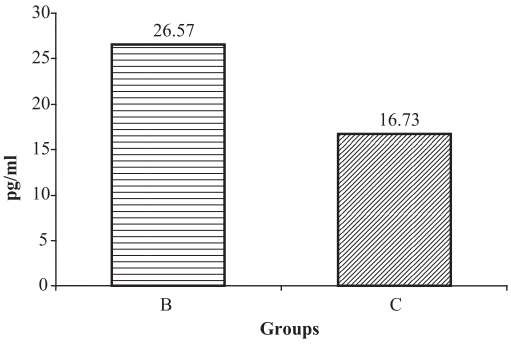
This cross sectional study was carried out in the Department of Physiology, Sir Salimullah Medical College, Dhaka from 1st January 2010 to 31st December 2010. A total number of 90 female subjects were included in this study. They were divided into control and study groups. Among them 60 women were taken as control (30 premenopausal women- group A and 30 natural menopausal women -group B) and 30 were taken as study (surgical menopausal-group C). However, age range of premanopausal women were from 30-35 years, natural menopausal women from 50-60 years and surgical menopausal women

from 45-55 years. All the menopausal women were selected from Out Patient Department (OPD) of Gynaecology and Obstetrics of Sir Salimullah Medical College and Mitford Hospital. Premenopausal women were selected by personal contact. All the subjects were belonged to lower middle socioeconomic status. Subjects with any acute or chronic disease (hypertension, diabetes mellitus, tuberculosis, and heart disease), suffering from mental disorder, using prescribed medicine or alcohol, and with smoking habit were excluded from the study. The aim, objectives, risk and the procedure of the study were explained in details to the subjects and their written informed consents were taken. Ethical permission was taken from the Institutional Ethics committee (IEC) of Sir Salimullah Medical College. Detailed family history and medical history of the subjects were also taken. Then their general information and data were recorded in the prefixed questionnaire. With all aseptic precautions, five (5) ml of venous blood was drawn from median cubital vein by sterile disposable syringe. Serum lipid profile of all participants were estimated by enzymatic method in the laboratory of Physiology Department, Sir Salimullah Medical College, Mitford [18,19]. Serum estrogen level[20] of menopausal women was estimated by AxSYM method in the Department of Biochemistry, BSMMU, Dhaka

Statistical analysis was done by using Statistical Package of Social Service (SPSS) for windows version 15. Data were expressed as mean ± SD ANOVA, Bonferroni test, Independent sample 't' test, Chi- square (χ^2) test and Fisher's exact test were used as the test of significance as applicable.

Results

The mean serum estrogen level was significantly ($p<0.001$) lower in surgical menopausal women (Group C) than that of natural menopausal women (Group B) (Figure 1).



Group B: Natural menopausal women. (Control)
Group C: Surgical menopausal women. (Study)

Figure1: Mean Serum Estrogen levels in menopausal women (n=60)

The mean TC, LDL-C and TG levels were significantly ($p<0.001$) higher whereas the mean HDL-C level was significantly ($p<0.001$) lower in surgical menopausal women (Group C) and natural menopausal women (Group B) than those of premanopausal women (Group A). Again, the mean TG level was significantly ($p<0.05$) higher whereas, mean TC and LDL-C levels were higher in surgical menopausal women but not significant (Group C) in comparison to those of natural menopausal women (Group B). Furthermore, mean HDL-C level was significantly ($p<0.001$) lower in surgical menopausal women (Group C) than that of natural menopausal women (Group B). (Table I)

Moreover, the percentage of the subject with abnormal lipid profile was higher in surgical menopausal women than that of natural menopausal women but the difference was not statistically significant. None of the subjects of premenopausal women had abnormal lipid profile status (Figure 2).

Table I: Serum lipid profile in different groups (n=90)

Groups	n	TC(mg/dl)	HDL(mg/dl)	LDL(mg/dl)	TG(mg/dl)
A	30	137.17 ± 7.95	39.53 ± 2.56	78.37 ± 9.08	96.33 ± 12.87
		(120.0-150.0)	(37.0-48.0)	(62.0-98.0)	(70.0-125.0)
B	30	206.13 ± 23.06	32.70 ± 3.22	142.53 ± 22.43	154.50 ± 23.57
		(166.0-256.0)	(26.0-40.0)	(101.0-192.0)	(114.0-216.0)
C	30	219.60 ± 37.75	27.63 ± 2.66	157.23 ± 33.47	173.67 ± 35.10
		(150.0-286.0)	(23.0-34.0)	(93.6-221.0)	(103.0-241.0)

Statistical analysis

Groups	TC (p value)	HDL (p value)	LDL (p value)	TG (p value)
A vs B vs C	0.000***	0.000***	0.000***	0.000***
A vs B	0.000***	0.000***	0.000***	0.000***
A vs C	0.000***	0.000***	0.000***	0.000***
B vs C	0.143^{ns}	0.000***	0.057^{ns}	0.014*

Data are expressed as Mean ± SD. For statistical analysis One way ANOVA was perfomed for comparison among the groups and then Bonferroni test was done to compare between two groups.
Figures in parentheses indicate ranges
Group A: Apparently healthy premenopausal women. (Baseline control), Group B: Natural menopausal women. (Control), Group C: Surgical menopausal women. (Study)
* = Significant at p <0.05, *** = Significant at p <0.001, ns = Not significant, n= total number of subjects

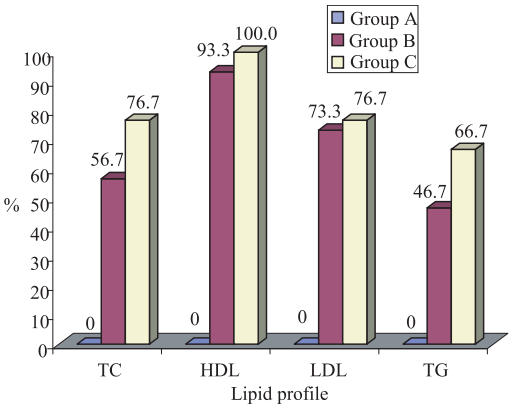


Figure 2: Distribution of the study subjects by abnormal lipid profile status (n=90)

Discussion

In the present study, mean TC, LDL-C and TG levels were significantly higher whereas the mean HDL-C level was significantly lower in surgical and natural menopausal women than those of premenopausal women. These findings are in agreement with those of researchers of different countries[7, 17, 21] .

Moreover, mean TG level was significantly higher whereas, mean TC and LDL-C levels were nonsignificantly higher in surgical menopausal women in comparison to those of natural menopausal women. Whereas, mean HDL-C level was significantly lower in surgical menopausal

women than that of natural menopausal women. Similar observations were also made by other research workers [3, 15, 16] .

Again, in this study, significantly lower serum estrogen level was found in surgical menopausal women than that of natural menopausal women. Similar finding was also made by other research workers [22] . On the contrary, some researchers observed higher level of serum estrogen level in surgical menopausal women than that of natural menopausal women [23]. This discrepancy may be due to higher age range of postmenopausal women in that study in comparison to our study group.

Small amount of estrogen and androgens are produced by ovary in natural menopausal women [13] . Whereas, after bilateral oophorectomy, serum estrogen and testosterone levels decreased and follicle stimulating hormone rises suddenly [4] .

Some investigators suggested that a significant amount of estrogen in menopausal women come from peripheral conversion of androstenedione in adipose tissue. Thus the conversion is greater in obese women [13] . Therefore, after surgical removal of ovary, there is significant decrease in androgen production resulting decrease in estrogen level [4] .

Gradual decrease of serum estrogen level especially after the age of 45 years may be responsible for some features of metabolic syndrome such as abdominal obesity, insulin resistance, dyslipidemia and hypertension [24] . It has been suggested that, estrogen deficiency after menopause causes insulin resistance which in turn causes increased circulatory level of TG [25] . In addition to this insulin resistance also causes increased activity of hormone sensitive lipase resulting in increased level of free fatty acid and accumulation of abdominal fat [9] .

Again, estrogen increases the number of LDL receptors in the liver and therefore increases the uptake of LDL-C from blood into liver [26] . Thus the serum level of this lipoprotein decreases. Furthermore, estrogen stimulates Apo-A_1 synthesis in liver and small intestine resulting in an increase in HDL-C level [27] . Thus estrogen deficiency in menopausal women may lead to increase serum LDL-C and decrease HDL-C level.

Serum estrogen level decreases abruptly after hysterectomy with bilateral oophorectomized women. This acute withdrawl of the hormone in surgical menopausal women may cause more changes in lipid profile level than those of natural menopausal women [16] .

In the present study, impairment of lipid profile status was observed in both natural and surgical menopausal women. The higher value of TC, LDL-C, TG and lower value of HDL-C observed in menopausal women of the present series are most likely due to estrogen deficiency as the measured value of them were lower. Again, in this study, significantly higher value of TG and significantly lower value of HDL-C in surgical menopausal women indicating that dyslipidaemia was more pronounced in this group of women compared to that of natural menopausal women. This is further supported by involvement of more number of subjects with abnormal lipid profile in surgical menopausal group which may be due to their lower level of serum estrogen.

Conclusion

From the present study, it can be concluded that dyslipidaemia was more pronounced in surgical menopausal women than those of natural menopausal women. Impairment of lipid profile status was observed by higher level of TC, LDL-C, TG and lower level of HDL-C in surgical menopausal women in comparison to those of natural menopausal women. All these changes may be due to their lower level of serum estrogen.

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