Effect Of Aerobic Exercise On Premature Menopausal Symptoms After Hysterectomy

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Abstract

Background: Women who have a hysterectomy usually go through menopause in earlier age. Estrogen levels fall sharply after hysterectomy and this condition is referred to as premature menopause. It can lead to higher levels of follicle stimulating hormone and luteinizing hormone in blood. **Purpose:** This study was conducted to detect the effect of aerobic exercise on premature menopausal symptoms after hysterectomy. **Subjects &Methods:** Forty women with recent total hysterectomy selected randomly. Their ages ranged from 30 to 40 years old and their body mass index was not exceeding 30 kg/m^2. They were divided into two groups equal in number, group (A) were treated by hormone replacement therapy(Conjugated Estrogens 2.5 mg and Medroxyprogestrone0.625 mg once daily) only for twelve weeks and group (B) were engaged in aerobic exercise program in the form of treadmill and stationary bicycle for 45 minutes, 3times per week, for twelve weeks and also was treated by the same hormone replacement therapy. Modified Greene scale was used to evaluate the premature menopausal symptoms; Blood sample analysis was used to show the levels of follicle stimulating hormone (FSH) and luteinizing hormone(LH) for both groups (A&B) before and after treatment.**Results:** The obtained results showed a statistically highly significant delay and overcome in the appearance of premature menopausal symptoms was found in group (B) than group (A).**Conclusions:**It could be concluded that the engagement of aerobic exercise program was very effective in overcoming or delaying the premature menopausal symptoms on post hysterectomy women.

Key words: Aerobic Exercise; Hysterectomy; Premature menopause.

Introduction

Hysterectomy is the surgical removal of the uterus. It may also involve removal of the cervix, ovaries, fallopian tubes and other surrounding structures **[1].**A woman may have a hysterectomy for different reasons, including: chronic pelvic pain, adenomyosis, a thickening of the uterus, uterine prolapse which is a sliding of the uterus from its normal position into the vaginal canal, cancer of the uterus, cervix, or ovaries, endometriosis and abnormal vaginal bleeding **[2].**

Hysterectomy may be total (removing the body, fundus and cervix of the uterus; often called complete) or partial (removal of the uterine body while leaving the cervix intact; also called supracervical). It is the most commonly performed gynecological surgical procedure. Removal of the uterus renders the patient unable to bear children

and has surgical risks as well as long-term effects, so the surgery is normally recommended when other treatment options are not available or have failed **[3].**There is also an increased risk of osteoporosis in women with low estrogen levels. Women with premature menopause have a longer time period of their life with low estrogen levels, which increases their risk for low bone density. Women can help offset this risk by taking calcium and vitamin D supplements, consuming plenty of dietary calcium and getting aerobic exercise such as walking **[4].**

To further complicate matters, the metabolism is also decreased. One reason of this metabolism decline with age is the loss of muscle mass (about half-a-pound a year). There is also a tendency to increase the intake of calories. As the metabolism drops, many women do not adjust their calories accordingly, which often leads to weight gain. The prevalence of the metabolic syndrome is reported to be significantly higher in postmenopausal women **[5].**

For women belonging to the status of premature menopause, it is imperative to plan a comprehensive health program for them, including lifestyle modifications. Exercise is an integral part of the strategy. Exercising prior to menopause is the only noncontroversial and beneficial aspect of lifestyle modification **[6].** The benefits are many, most important being maintenance of muscle mass and thereby the bone mass and strength. It should aim for two hours and 30 minutes of moderate aerobic activity each week. This could help to manage the stress of life and premature menopause-related symptoms**[7].**

Despite all the physiological changes, premature menopause should not be viewed as a sign of impending decline, but rather a beginning of a good health program including lifestyle changes in diet and exercise including the aerobic form. Aerobic exercise increases the cardiorespiratory function. If done regularly, it reduces the metabolic risks associated with declining estrogen. It increases high density lipoprotein (HDL), reduces low density lipoprotein (LDL), triglycerides and fibrinogen. There is an additional benefit of a reduced risk of high blood pressure, heart attacks and strokes.Aerobic exercise can help create a calorie deficit and minimize midlife weight gain. It increases the bone mass, strength training and impact activities (like walking or running) can help to offset the decline of bone mineral density and prevent osteoporosis, it also reduces low back pain. It is proven to help reduce stress and improve the mood. It may help to reduce hot flashes **[7].**

Aerobic exercise program showed a statistically significant ($P<0.05$) improvement in cardiovascular health from (8.31 ± 1.59) to (5.36 ± 1.56) and also revealed a statistically significant improvement in the lumbar spine range of movement from (27.89 ± 12.7) to (41.05 ± 8.36)**[8].**

Aerobic exercise is a non-invasive, fast and effective method that has been proven in clinical trials to reduce hot flushes, fatigueand weight gain, loss of lean mass, anxiety and depression. It also improves the cardiovascular health and prevents bone loss problems as osteoporosis**[9].**

This study was a trail to determine the effectiveness of aerobic exercise in overcoming or delaying the premature symptoms of menopause after total hysterectomy.

Materials and methods:

The Participants:

Forty married women who had total hysterectomy operation were selected randomly from gynecology department in Said Galal University hospital in Cairo; Al

AzharUniversity. The study was conducted from August 2016 to March 2017. They were selected on the following criteria:

Inclusion criteria:

1. Their ages ranged from 30: 40 years.
2. Their body mass index was not exceeding 30 kg/m^2.
3. Women with total hysterectomy operation.
4. Women who had their hysterectomy operation within 6-12 months ago.
5. Women who were not reached menopause (with Modified Greene Scale scores more than 5 and less than 21).
6. Not engaged in any other treatment programs.

Exclusion criteria:

They were examined by a physician before the study and the patients who excluded from the study included:

1- Patients who under the age of 30 years or over 40 years.
2- Patients who reached menopause (Modified Greene Scale scores more than 21).
3- Women with Modified Greene Scale scores less than 5 and more than 20.
4- Patients who suffered from any systemic diseases that may interfere with the objectives of the study (renal, liver, hepatic or endocrinal disorders).
5- Patients with a history of cardiac affection and using a pace maker.
6- Patients with previous back surgery, evidence of previous vertebral fracture, spondylolisthesis or spinal stenosis.
7- Patients who were smokers.
8- Patients with neuromuscular diseases as myalgia, muscle weakness and paresthesia.
9- Patients who suffered from epileptic fits, mental or psychological disorders.
10- Patients with a history of vascular or circulatory diseases.

Study design:

Two groups pre and post experimental design. Forty patients, their ages ranged from 30-40 years, with recent total hysterectomy operations were assigned randomly to two equal groups.

Group A: (Control group): 20 patients with total hysterectomy operation who were treated with hormone replacement therapy only (Conjugated Estrogens 2.5 mg and Medroxyprogesterone 0.625 mg once daily).

Group B: (Study group): 20 patients engaged in aerobic exercises program in the form of treadmill and stationary bicycle 3 times /week for 12 weeks for 3 months. Each session toke from 45 minutes as the following: 5 min warming up exercise by walking on treadmill by low speed, 35 minutes conditioning exercise by walking on a treadmill 20 minutes and cycling on a stationary bicycle 15 minutes at moderate intensity (70% of maximum heart rate) and 5 minutes cooling down by walking on treadmill by low speed as in warming up. They also were treated with hormone replacement therapy only (Conjugated Estrogens 2.5 mg and Medroxyprogesterone 0.625 mg once daily).

Measurement Procedures:

All patients were given a full explanation of the protocol of the study and consent form was signed for each patient before participating in the study.

1- Standard weight and height scale:

To calculate the BMI according to the following equation:

BMI=weight/height^2 (Kg/m^2), for both groups (A&B) for each patient before treatment for both groups (A and B).

2- Modified Greene Scale:

This diagnostic score sheetwas used for evaluating the premature menopausal symptoms. Follow up of menopausal symptoms before starting the treatment and after 3 months of starting treatment. It recorded the severity of menopausal symptoms as the following score; 1 for mild, 2 for moderate, 3 for severe and 0 if she did not have that particular symptom. A score of 15 or over usually indicates estrogen deficiency that is intrusive enough to require treatment and Scores of 20-50 are common in symptomatic women, score would reduce to 10 or under in 3-6 months with the adequate treatment**[10].**

3- Blood sample analysis:

Conditions with high FSH and LH levels include premature menopause also known as premature ovarian failure and poor ovarian reserve also known as premature ovarian aging **[11].**

Treatment procedures:

Group A: (Control group): 20 patients with total hysterectomy operation received hormone replacement therapy only (Conjugated Estrogens 2.5 mg and Medroxyprogesterone0.625 mg once daily).

Group B: (Study group): 20 patients engaged in aerobic exercises program 3 times /week for 12 weeks for 3 months in the form of walking in a treadmill and cycling on a bicycle. Duration: 45 minutes for each session (5 minutes for warm up, 35 minutes conditioning exercise phase "20 minutes for walking in a treadmill and 15 minutes for bicycling", 5 minutes cooling down). They also receivedhormone replacement therapy as in group (A).

Data analysis:

Results are expressed as mean ± standard deviation. Test of normality, Kolmogorov-Smirnov test, was used to measure the distribution of data measured pre-treatment. Accordingly, comparison between variables in the two groups was performed using either unpaired t test or Mann-Whitney test whenever it was appropriate.

Comparison between variables measured before and after treatment in the same group was performed using either paired t test or Wilcoxon signed ranks test whenever it was appropriate.

Statistical Package for Social Sciences (SPSS) computer program (version 19 windows) was used for data analysis. P value ≤ 0.05 was considered significant.

Results:

1- Characteristics of the subjects:

Group A:As shown in Table 1the mean values (± SD) of age, weight, height and BMI were 36.15 ± 2.72 yrs, 63.05 ± 5.91 kg, 162.95 ± 7.71 cm 23.74 ± 1.88 kg/m^{2}respectively.

Group B: The mean values (± SD) of age, weight, height and BMI were35.60 ± 2.64 yrs., 64.85 ± 6.90 kg, 162.85 ± 4.72 cm and 24.38 ± 2.18kg/m^{2}respectively. As shown in Table 1.

Comparing the general characteristics of the subjects of both groups revealed that there were no statistical significant differences($p > 0.05$) in the mean values between the two groups as regards the age ($t = 0.648$, $p = 0.521$), weight ($t = -0.886$, $p = 0.381$), height ($t = 0.049$, $p = 0.961$) and BMI ($t = -1.012$, $p = 0.318$). As shown in Table 1

Table (1): General characteristics of the two groups (A & B).

Variables	Group A (n= 20)	Group B (n= 20)	t value	P value
Age (yrs.)	36.15 ± 2.72	35.60 ± 2.64	0.648	0.521 (NS)
Weight (kg.)	63.05 ± 5.91	64.85 ± 6.90	-0.886	0.381 (NS)
Height (cm.)	162.95 ± 7.71	162.85 ± 4.72	0.049	0.961 (NS)
BMI	23.74 ± 1.88	24.38 ± 2.18	-1.012	0.318 (NS)

Data are expressed as mean ± SD. NS= p> 0.05= not significant.

2-Hormonal blood analysis of FSH and LH:

A-Follicle Stimulating Hormone (FSH):

- ***Comparing pre and post-treatment mean values of FSH within each group (A) and (B):***

In group (A), as shown in Table 2, there was no statistical significant difference between the mean value of FSH measured before treatment (24.48 ± 3.09) and its corresponding value measured after treatment (24.68 ± 2.95) with t value = -0.397 and p value = 0.696. The percentage of increase in the mean value of FSH in group (A) was 0.82%.

In group (B), there was a statistical significant difference in the mean value of FSH measured after treatment (19.87 ± 2.74) when compared with its corresponding value measured before treatment (23.63 ± 2.39) with t value = 8.397 and p value = 0.001. The percentage of decrease in the mean value of FSH in group (B) was 15.91%. As shown in Table 2.

- ***Comparing pre and post-treatment mean values of FSH between groups (A) and (B):***

Before treatment, there was no statistical significant difference between the mean value of FSH in group (A) (24.48 ± 3.09) and its corresponding value in group (B) (23.63 ± 2.39) with t value = 0.961 and p value = 0.342. As shown in Table 2.

After treatment, there was a statistical significant difference in the mean value of FSH in group (B) (19.87 ± 2.74) when compared with its corresponding value in group (A) (24.68 ± 2.95) with t value = 5.343 and p value = 0.001. As shown in Table 2.

Table (2): Inter and intra-group comparison between mean values of FSH in the two groups (A &B) measured before and after treatment.

Date of assessment	Group A (n= 20)	Group B (n= 20)	t# value	P value
Before treatment	24.48 ± 3.09	23.63 ± 2.39	0.961	0.342 (NS)
After treatment	24.68 ± 2.95	19.87 ± 2.74	5.343	0.001 (S)
Mean difference	-0.20	3.76		
% change	0.82 ↑↑	15.91 ↓↓		
t## value	-0.397	8.397		
p value	0.696 (NS)	0.001 (S)		

Data are expressed as mean ± SD. t# = unpaired t test. NS= p> 0.05= not significant.
t## = paired t test. S= p< 0.05= significant.

B-Luteinizing Hormone (LH):

- ***Comparing pre and post-treatment mean values of LH within each group (A) and (B):***

In group (A), there was no statistical significant difference between the mean value of LH measured before treatment (27.74 ± 3.94) and its corresponding value measured after treatment (28.04 ± 4.09) with t value = -1.675 and p value = 0.110.The percentage of increase in the mean value of LH in group (A) was 1.08%. As shown in Table 3.

In group (B), there was a statistical significant difference in the mean value of LH measured after treatment (21.66 ± 3.64) when compared with its corresponding value measured before treatment (25.81 ± 3.39) with t value = 16.448 and p value = 0.001. The percentage of decrease in the mean value of LH in group (B) was 16.08.As shown in Table 3.

- ***Comparing pre and post-treatment mean values of LH between groups (A) and (B):***

Before treatment, there was no statistical significant difference between the mean value of LH in group (A) (27.74 ± 3.94) and its corresponding value in group (B) (25.81 ± 3.39) with t value = 1.656 and p value = 0.106. As shown in Table 3. After treatment, there was a statistical significant difference in the mean value of LH in group (B) (21.66 ± 3.64) when compared with its corresponding value in group (A) (28.04 ± 4.09) with t value = 5.205 and p value = 0.001. As shown in Table 3.

Table (3): Inter and intra-group comparison between mean values of LH in the two groups (A & B) measured before and after treatment.

Date of assessment	Group A (n= 20)	Group B (n= 20)	$t^{\#}$ value	P value
Before treatment	27.74 ± 3.94	25.81 ± 3.39	1.656	0.106 (NS)
After treatment	28.04 ± 4.09	21.66 ± 3.64	5.205	0.001 (S)
Mean difference	-0.30	4.15		
% change	1.08 ↑↑	16.08 ↓↓		
$t^{\#\#}$ value	-1.675	16.448		
p value	0.110 (NS)	0.001 (S)		

Data are expressed as mean ± SD. $t^{\#}$= unpaired t test. NS= p> 0.05= not significant.
$t^{\#\#}$= paired t test.S= p< 0.05= significant.

3- Modified Greene Scale (MGS):

- ***Comparing pre and post-treatment mean values of MGS within each group (A) and (B):***

In group (A), there was a statistical significant difference in the value of modified Greene scale measured after treatment (11.75 ± 1.41) when compared with its corresponding value measured before treatment (13.20 ± 1.32) with Z value = -3.643 and p value = 0.001. The percentage of decrease in the value of modified Greene scale is lowers in group (A) (10.98%) than in group (B) (32.02%). As shown in Table 4.

Also in group (B), there was a statistical significant difference in the value of modified Greene scale measured after treatment (8.60 ± 1.27) when compared with its corresponding value measured before treatment (12.65 ± 1.47) with Z value = -3.942 and p value = 0.001. The percentage of decrease in the value of modified Greene scale in higher in group (B) (32.02%) than in group (A) (10.98%). As shown in Table 4.

- ***Comparing pre and post-treatment mean values of MGS between groups (A) and (B):***

Before treatment, there was no statistical significant difference between the value of modified Greene scale in group (A) (13.20 ± 1.32) and its corresponding value in group (B) (12.65 ± 1.47) with Z value = -0.653 and p value = 0.514. As shown in Table 4.

After treatment, there was a statistical significant difference (decreased in group B more than group A) in the value of modified Greene scale in group (B) (8.60 ± 1.27) when compared with its corresponding value in group (A) (11.75 ± 1.41) with Z value = -4.890 and p value = 0.001. As shown in Table 4.

Table (4): Inter and intra-group comparison between values of modified Greene scale in the two groups (A & B) measured before and after treatment.

Date of assessment	Group A (n= 20)	Group B (n= 20)	$Z^{\#}$ value	P value
Before treatment	13.20 ± 1.32	12.65 ± 1.47	-0.653	0.514 (NS)
After treatment	11.75 ± 1.41	8.60 ± 1.27	-4.890	0.001 (S)
Mean difference	1.45	4.05		
% change	10.98 ↓↓	32.02 ↓↓		
$Z^{\#\#}$ value	-3.643	-3.942		
p value	0.001 (NS)	0.001 (S)		

Data are expressed as mean ± SD. $Z^{\#}$= Mann-Whitney test.NS= p> 0.05= not significant.
$Z^{\#\#}$= Wilcoxon Signed Ranks test.S= p< 0.05= significant.

Discussion:

For women belonging to the status of premature menopause, it was imperative to plan a comprehensive health program, including lifestyle modifications. Aerobic exercise is an integral part of the strategy. The benefits are many, most important being maintenance of muscle mass and thereby the bone mass and strength. It should aim for two hours and 30 minutes of moderate aerobic activity each week. This can help to manage the stress of life and premature menopause-relatedsymptoms **[5]**.Despite all the physiological changes, premature menopause should not be viewed as a sign of impending decline, but rather a beginning of a good health program including lifestyle changes in diet and exercise including the aerobic form. Aerobic exercise increases the cardiorespiratory function. If done regularly, it reduces the metabolic risks associated with declining estrogen. It increases high density lipoprotein (HDL), reduces low density lipoprotein (LDL), triglycerides and fibrinogen. There is an additional benefit of a reduced risk of high blood pressure, heart attacks and strokes. Aerobic exercise can help create a calorie deficit and minimize midlife weight gain. It increases the bone mass. Strength training and impact activities (like walking or running) can help to offset the decline of bone mineral density and prevent osteoporosis. It also reduces low back pain. Aerobic exercise is proven to help reduce stress and improve the mood. It may help to reduce hot flashes **[8].**

The results of this study found that, within groups there was a statistically significant (P<0.01) delaying in symptoms of premature menopausal symptoms in both groups (A&B) after receiving the hormone replacement therapy (Conjugated Estrogens 2.5 mg and Medroxyprogesterone 0.625 mg once daily) and engaging in aerobic exercise program on post total hysterectomy women. But between groups the obtained results showed that a statistically highly significant delay and overcome (P<0.01) in the appearance of premature menopausal symptoms was found in group (B) after engagement in aerobic exercise program with receiving the hormone replacement therapy than group (A) that received the hormone replacement therapy only on total hysterectomy women.

Accordingly, it can be concluded that the engagement of aerobic exercise program was very effective in delaying and overcoming the premature menopausal symptoms on post hysterectomy women.

The results of our study are supported by that of **Manson, [12]** who found that physical activity –usually five or more hours of exercise per week- lowers estrogen levels and that may be why it is linked to early onset of menopause.

Also our results agreed with that of **Chisato, [13]**who stated that early menopause has been linked to physical activity and regular heart-healthy patternsas both of them are advisable for reducing the risk for several hormone-related cancers and osteoporosis.

Also the results are supported by **Hopkins, [14]** who found that the initiation of moderate intensity training in previously ovulating untrained women frequently leads to corpus luteum dysfunction associated with insufficient progesterone secretion and, in the case of short luteal phase cycles, decreased luteal phase length. That exercise may alter the neuroendocrine system is suggested by a delay in the ovulatory LH peak in spite of increased estriol (estrogen) excretion; moreover, less LH is excreted during the luteal phase. The lack of positive feedback to estrogens and decreased LH secretion during the luteal phase could compromise corpus luteum function.

The results of this study agreed with that of **Kim, [15]** who found that there is strong evidence for the benefit of aerobic exercise in supporting fat loss, reducing the risk of heart diseases and enhancing the mental health. Muscle strengthening activities are recommended on at least 2 days each week and it is important to minimize the amount of prolonged sitting.

Our results also agreed with those of **Daley, [16]** who found that aerobic exercise makes use of large muscle groups while keeping up heart rate –as walking, jogging, biking and swimming- reduces low density lipoprotein, triglycerides. There is an additional benefit of a reduced risk of high blood pressure, heart attacks and strokes. It is recommended for the beginners to start with 20 minutes of light activity and slowly boosting exercise intensity as it becomes easier.

Our results also agreed with that of**Mansikamaki, [17]** who found that it is recommended to exercise in the morning for women who are complaining of hot flushes. At this time of the day, levels of hormone cortisol are higher, which lowers insulin action and keeps blood glucose levels from dropping and circulating. Insulin is also lower (prior to any insulin taken for breakfast).

The obtained results supported by **Steriani, [18]** who found that in a small of Finnish women who had recently entered menopause, those who stuck to an aerobic exercise program for six month were less likely to report night sweats, mood swings and irritability than women who did not exercise. The study's authors say their results suggest exercise could serve as alternative to hormone replacement therapy for quelling bothersome menopause symptoms. In the years just after woman reaches menopause, up to 80 percent may experience some or all of the most typical symptoms including hot flushes with night sweat, headache, depression, irritability, urinary problems and vaginal dryness. Estrogen-based therapy can ease those symptoms, but concerns about health risks associated with the hormones have led many women to further side effects of the hormonal therapy.

In contradiction, **Borg, [19]** that occurred primarily of inclusion criteria included being 40–62 years of age, in late peri- or post-menopause or having a hysterectomy with FSH >20 mlU/mL and estradiol ≤50 pg/mL and in good general health. Vasomotor symptoms (VMS) eligibility criteria were ≥14 VMS/week in each of three consecutive weeks, based on daily diaries, VMS frequency between visits 1 and 2 no less than 50% of weekly mean in the two weeks before visit 1 and VMS rated as severe or bothersome on at least 4 occasions each week. Exclusion criteria included: BMI>37, use of hormones or hormonal contraceptives in the past 2 months, use of prescription or over-the-counter treatments for VMS in the past month, unstable medical conditions, current participation in regular exercise or yoga, current use of omega-3 supplements or frequent consumption of fish, contraindications to exercise training (e.g., physical limitations), yoga, or omega-3 (e.g., allergy to soy or fish; current use of anti-coagulants); or a major depressive episode in the past three months. The exercise intervention consisted of 12 weeks of three individualized cardiovascular conditioning training sessions per week conducted at local fitness facilities and supervised by a trained, certified exercise trainer. Women chose whether to exercise on a treadmill, elliptical trainer or stationary bicycle. The target heart rate (THR), monitored throughout training with a heart rate monitor was 50–60% heart rate reserve (HRR) for the first month and 60–70% HRR (approximately 125–145 bpm) for the remainder of the intervention. Trainers recorded the THR, workload and perceived exertion every 5–10 minutes. These findings provide strong evidence that 12-weeks of moderate-intensity aerobic exercise do not alleviate VMS but may result in small improvements in sleep quality, insomnia and depression in midlife sedentary women **[19].** This contradiction may be due to that women who were engaged in this study reached their menopause, as their ages ranged between 40–62 years of age. In the our study, we assessed the effect of aerobic exercise on women who their ages ranged from 30 to 40 years old, after total hysterectomy operation which was performed since 6 to 12 months and their body mass index was not exceeding 30 kg/m^2. That means women in the current study were premenopausal and were not reached their menopause yet.

Conclusion:

Theengagement of aerobic exercise program was very effective in overcoming or delaying the premature menopausal symptoms on post hysterectomy women.

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تأثير التمرينات الهوائية علي الأعراض المبكرة لإنقطاع الطمث بعد عمليات إستئصال الرحم

مقدمة:لقد وجد أن السيدات اللواتي قمن بإجراء عمليات إستئصال الرحم عادة ما تدخلن في سن اليأس مبكرا عن مثيلاتهن. حيث إن معدلات مستوي هرمون الأستروجين تنخفض بحدة عقب عمليات إستئصال الرحم، و تسمي هذه الحالة بسن اليأس المبكر. و هذا بدوره يؤدي إلي ارتفاع معدلات هرموني الملتونوالهرمونالمحفزللجريبفيالدم. أجريت هذه الدراسة لمعرفةتأثيرالتمرينات الهوائيةفي التغلب علي أو تأخير ظهور الأعراض المبكرة لإنقطاع الطمث بعد عمليات إستئصال الرحم.

الطرق:شاركفيهذهالدراسةأربعونسيدةتعرضنلإنقطاعالطمثالمبكربعدإجراءجراحةإستئصالكاملللرحم. قدتماختيارهنعشوائياتراوحتأعمارهنبين ٣٠-٤٠سنةودليلكتلةأجسامهنلاتزيدعن ٣٠ كيلوجرام/مترمربع.تمتقسيمهنإلىمجموعتينمتساويتينفيالعدد: المجموعة (أ) عولجتبإستخدامالهرموناتالتعويضية (أقراصإستروجينمقترن ٢.٥ مجوميدروكسيبروجيستيرون ٠.٦٢٥ مجمرةواحدةيوميا) لمدةثلاثةأشهر. بينماالمجموعة (ب)

عولجتبإستخدامنفسالهرموناتالتعويضيةمعاتباعبرنامجتمريناتهوائيةبإستخداماالمشايةالكهربائيةوالعجلةالثابتةلمدةخمسةوار بعيندقيقة، ثلاثجلساتأسبوعيالمدةثلاثةأشهر .
تمتشخيصظهورالأعراضالمبكرةلإنقطاعالطمثعنطريقتحاليلطبيةلتحديدمستوياتهرمونالملتونوالهرمونالمحفزللجريبفيالدم،مقياسجرينيالمعدللتقييمظهورالأعراضالمبكرةلإنقطاعالدورةالشهريةلدياالسيدات (أ ، ب) قبلوبعدالعلاج.

النتائج:
وقدأوضحتنتائجالدراسةوجودتأخيرذودلالةإحصائيةفيظهورالأعراضالمبكرةلإنقطاعالطمثفيكلتاالمجموعتين (أ ، ب)
بعدتطبيقالعلاجبالهرموناتالتعويضيةواتباعبرنامجتمريناتهوائيةمعالعلاجبالهرموناتالتعويضيةعلىالسيداتبعدعملياتإستصالالرحم.

بالمقارنةبينالمجموعتين (أ ، ب)
أوضحتنتائجالدراسةأنهذاالتأخيرذوالدلالةالإحصائيةالعاليةفيظهورالأعراضالمبكرةلإنقطاعالطمثكانأفضلبعدتطبيقبرنامجالتمريناتالهوائيةمعالعلاجبالهرموناتالتعويضيةمنالعلاجبالهرموناتالتعويضيةفقطلدياالسيداتبعدعملياتإستصالالرحم.

الأستنتاجات:
وهكذايمكنأننستخلصأنإتباعبرنامجالتمريناتالهوائيةكانوسيلهمؤثرهومساعدهفيتأخيرظهورالأعراضالمبكرةلإنقطاعالطمثوتحسنتلكالأعراضلدياالسيداتبعدعملياتإستئصالالرحم.

الكلماتالدالة:التمريناتالهوائية- عملياتإستئصالالرحم -الأعراضالمبكرةلإنقطاعالطمث.