The Efficiency of Cavitation Ultrasound Therapy on Visceral Adiposity in Perimenpausal Women

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ABSTRACT

Background: *The evidence of the adverse effects of obesity on women's health is overwhelming and indisputable. Obesity has been linked to development of diabetes mellitus, cardiovascular diseases, dementia, and cancers. Specifically, in the accumulation of abdominal visceral adipose tissue were related to difference in the metabolic profile and indicator of cardiovascular disease (CVD) risk in postmenopausal women. The purpose of this study was to determine the efficiency of cavitation ultrasound therapy in reducing visceral adiposity of perimenopausal obese women.* ***Methods:*** *fifty perimenopausal obese women, their age ranged between 37 and 49 years, their BMI between 31.5 and 40.04Kg/ m^2, WHR between 0.9 and .95% and waist circumference between 89 and 108 cm, were selected from the out patient clinic of Gynecological Department Faculty of Medicine, Cairo University. They were assigned into two equal groups A and B. Each of them consisted of 15 participants. Group (A) followed low-calorie diet alone. While, group (B) received cavitation ultrasound therapy on the abdomen region and follow a low-calorie diet. The study lasted for three consecutive months. Evaluation was done for both groups before and after treatment, to evaluate the body weight, waist circumference, waist hip ratio, total body composition and plasma liopoprotein profile.* ***Results:*** *No significant differences were observed when comparing the pre treatment results of both groups. However significant improvement was noticed in all measuring variables for both groups, when comparing their pre and post treatment mean values. After treatment, significant differences were observed when the results of both groups were compared in favor of group (B).* ***Conclusions:*** *The results of this study testified that the combination of cavitation ultrasound therapy and low-calorie diet characterized by a higher efficiency than a low-calorie diet alone in lowering anthropometric, total body composition and plasma liopoprotein variables. In addition, cavitation ultrasound therapy is an additional useful physical therapy method in reducing of visceral adiposity in perimenopausal obese women.*

Keywords: *Obesity, cavitation ultrasound therapy, low-calorie diet, perimenopause, visceral adiposity, total body composition.*

INTRODUCTION

The prevalence of obesity and associated comorbidities is increasing which underscores the importance of developing effective strategies for reducing obesity and the risk of metabolic disease in women. However, tissue laxity and localized subcutaneous fat deposits on the body are increasingly common complaints amongst our patients. Chronological aging, photo-aging or substantial changes in body dimensions experienced during pregnancy or weight loss can all contribute to the formation of lax skin and localized fat[5,14].

Literally, the term perimenopause means "around the menopause"[4]. Generally, however, clinicians use the term to refer to the several years or more that precede the final cessation of menstruation. The North American Menopause Society defines the perimenopause as the entire menopausal transition plus 1 year after the final menstrual period[20]. The perimenopause, a woman begins to experience the changes associated with impending menopause. Although each woman is different, the perimenopause typically begins in the mid- to late40s and menopause occurs at an average age of 51[23].

Obesity is common complaint among perimenopausal women, with aging women metabolisms slow so that, reducing in her caloric requirements and if her eating and exercises habits do not change a women may gain weight Moreover, weight gain during this period is associated with fat deposition in the abdomen[13]. Abdominal adiposity is an excess body fat distributed around the waist more than 35 inches which increases the likelihood

of developing insulin resistance and subsequent diabetes and heart diseases[19]. Numerous factors underline the weight gain that may occur during this period, including genetic factors neuropeptides, adrenergic nerves system activity and hormones[30]. Cardiovascular disease, the leading cause of death in women also it is an important health concern for the perimenopausal women[31].

Billions of dollars are spent each year on exercise programs and weight-loss products in an attempt to reduce or maintain one's body shape. There is also the surgical option of liposuction, which was the second most popular surgical procedure being per- formed by plastic surgeons in the United States in 2008 (American Society of Aesthetic Plastic Surgery national statistics)[27]. With a liposuction procedure, there are surgical risks and downtime to consider. Patients are now seeking alternative methods for effective reduction of localized areas of fat deposits without surgery. There are several different techniques being utilized to provide nonsurgical fat disruption such as mesotherapy, cryotherapy, and focused ultrasound therapy[6].

The cavitation used in the field of aesthetic medicine is an innovative technique for a non-surgical reduction of the localized fat and cellulite, Ultrasonic vibrations spread in the form of a wave in medium such as a liquid or a solid. When the particles of an elastic medium are under ultrasounic vibration, they act continuously in only one direction[14]. This phenomenon called cavitation, and is a very smart way to reduce fat because it is convert the fat into liquid and then is naturally eliminated with the urine when cavitation therapy is followed by lymphatic drainage.; the process is faster and the drainage is very effective[29].

The lipolytic range of ultrasounds is 30-70 KHz, and the best effects are obtained in a range between30-35 KHz. The depth of the treatment in the tissues is generally2-3 cm, to avoid muscles involvement[17].

Estrogen has a number of cardioprotective benefits including favorable effects on blood lipids levels[30]. Estrogen deficiency adversely affect circulating lipid levels, leading to increase in low-density lipoprotein cholesterol, total serum cholesterol and triglyceride levels and a decline in high density lipoprotein cholesterol[18]. As women grow older, their rates of myocardial infraction and stroke approach exceed those of men[19].

A healthful diet, low in fat and high in grains, fruits and vegetables can benefit perimenopausal women by reducing their risk of atherosclerotic disease, hypertension, osteoporosis, diabetes mellitus, cancer and obesity[10]. Regular exercise, along with moderate caloric control, will help women maintain a healthy weight and avoid the weight gain often associated with the perimenopause[18].

Ryan et al. (2000)[25] suggested that changes in energy expenditure and dietary intake patterns may play a role in weight gain during menopause. In a longitudinal study of perimenopausal women, they reported that women who experienced menopause had greater decreases in resting metabolic rate and leisure-time physical activity than did women of the same age who remained premenopausal. Both groups of women slightly increased their energy intake; thus, the women who experienced menopause had a significantly greater positive energy balance than did the premenopausal women.

MATERIALS AND METHODS

Subjects

Fifty perimenopausal abdominally obese women the mean age was (44.48 ± 5.20 years), Height (165.44 ± 5.52 Centimeters), Weight (95.95 ± 9.26 Kilograms), Body mass index (36.77 ± 3.13 Kilograms/meter), Waist circumference (96.74 ± 4.76 centimeters) and waist hip ratio (0.93 ± 0.50 percentage) abdominally adiposity defined by waist / hip ratio more than 0.80 %, were selected from the out patient clinic of gynecological department faculty of medicine, Cairo University. All Women signed informed consent after reading it and hearing verbal explanations of the relevant doubts.

All women free from any medical disorders as diabetes mellitus, thyroid dysfunction or concomitant cardiovascular respiratory, renal and liver dysfunctions or on medication known to effect carbohydrate or

lipid metabolism were excluded from the present study. Perimenopausal status was as certain by self report on the basis of regularity of the menstrual cycle at physical examination.

All women were randomly divided into two groups equal in numbers. Group (A) received low calorie diet alone and Group (B) received cavitation ultrasound therapy on the abdomen region and low calorie diet.

MATERIALS AND METHODS

Materials

Assessment tools:

- Weight height scale for measuring the weight and height.
- A one centimeter wide measuring tape to measure waist and hip circumference.
- Bio Dynamics (model 310, USA) is a portable, battery-powered bioimpedance analyzer. Subject assessments are conducted using a connection between the analyzer and the wrist and ankle of the subject. Connections to the subject are through standard ECG sensor pad electrodes. Resistance and reactance, the two components of impedance, were measured directly from the body to measure percentage body fat, lean weight, fat weight and basal metabolic rate.

Treatment tools

Cavitation ultrasound therapy was done in group (B). Using ultrasonic cavitation machine (Cavi -SMART, South Korea), supplied with specific parameters, Frequency: 40 KHz, Ultrasonic output power: 50W, Ultrasonic Output mode: hand-held treatment head (50mm diameter, round stainless Steel), Size: 450 × 300 × 250mm and weight: 7Kg.

Methods

A- Evaluative procedures:

- Initially, a careful history was taken from each perimenopausal women then the following evaluation and recording of the parameter for each participant of the two studying groups were made at the beginning and at the end of study period (three months).
- Anthropometric measurement: Height and body weight were measured with women wearing light clothes and bare feet also, body mass index in which the weight in kilograms divided by the square of the height in meters and waist to hip circumference they were evaluated over single layer of clothing with women standing in an a erect position with feet together waist circumference it was obtained at level of umbilicus with normal respiratory pattern while , Hip circumference it was obtained at the level of greater than the waist to hip ratio was calculated.
- Bioelectrical impedance measurements: The measurements were made about two hours after eating and with the thirty minutes after voiding. Each woman wore clothes but no shoes or socks and lied on supine lying position. After cleaning all skin contact area with alcohol aluminum foil spot electrodes were placed on the dorsal surfaces of the hands and feet at the distal metacarpals and metatarsals respectively and also between the distal prominences of the radius and ulna and between the medial and lateral malleoli at the ankle and clips attached these spot electrodes to the analyzer, the height, weight, age and sex were feed into then analyzer[15]. After calibrators of the machine a painless localized electric signal was started to ran through the body tissue and impedance to current flow was determined the impedance to current flow was converted to represent the percent of body fat , fat weight, lean weight and basal metabolic rate[26].
- Plasma lipoprotein- lipids profile: A venous blood samples were collected from each woman after twelfth hours over night fast for the measurement of plasma lipid and lipoprotein level. The samples were collected in plain tubes and were transported to the laboratory. Serum was removed and stored at 50ºC for measurement of triglyceride, total cholesterol low density lipoprotein and high density lipoprotein[21].

B- Treatment procedures:

The cavitation ultrasound therapy was done only in group (B) using ultrasonic cavitation machine (Cavi SMART, South

Korea, supplied with one piece cavitation probe of 40 KHz, 3-6 W/cm^2 adjustable, 60W with 20cm^2 active surface). A first preliminary visit is done to highlight the adipose tissue with at least 2cm thickness; the patients are then informed about the treatment and a medical screening is carried out to check the patients are not affected by dyslipidemic or hepatic disorders, tumoral and autoimmune disorders and skin pathologies in the areas to treat[6]. On the session day before starting treatment session, each woman was asked to evacuate her bladder to make sure that she was comfortable and relaxed. After the area to treat has been clearly signed through apposite dermographic pencils, the patient is comfortably positioned on a bed, avoiding reducing the thickness of the adipose tissue that follows excessive skin tensions caused by eventual underlying bones prominence. Then the woman lied in supine lying position for treatment of the abdomenal area. The area to treat is then isolated with small surgery sheets and sprinkled with an ultrasound conductive gel to facilitate the spread of the ultrasound waves; it also works as coupling mean probe-skin, avoiding reflection phenomena. In order to obtain the desired result, the areas with localized fat are treated twice times per week for three consecutive months.

The main steps to apply the cavitation ultrasound therapy are the following firstly, defining and evaluating the treatment area; drawing up an information consensus document by the patient before starting the cavitation sessions. Secondary, using an adequate quantity of coupling gel on the skin; paying attention it is always there under the probe between the probe and the skin. Finally, once the treatment is complete and the gel was wiped off the patient's skin, with special care must be taken with the transducer and the transducer contains ceramic and cleaned only with 70% alcohol[17.] In order to stimulate the purifying action of the liver and kidneys, it is fundamental to suggest the patient to start drinking from the week before the session, at least 1.5 – 2 liter of water a day[6]. In the current study, the treatment area was done for the abdominal area with average time of 20 -30 minutes for each area per session, continuous emission with frequency 30-35 KHz and 70-80 % of the maximum power 3Watts/cm2 for each area, for three consecutive months[28].

Diet therapy protocol: The diet principle in both groups (A&B) assured that energy intake was 500K calorie below daily requirements on average three meals at the same time of the day. The composition of the dietary regimen was: carbohydrates (55%), Proteins (30%), Fat (15%), Fiber 20g, Sodium 1.1g, Potassium 3g and 2 Litters of fluids were included daily. Each woman's basal metabolic rate (BMR) was measured to determine her energy requirement during the study period by the bio-impedance analyzer. This regimen was very similar to the Mediterranean style step (I) diet, which is under active evaluation by the American Heart Association as possible tool to lower cardiovascular risks[24]. All women were encouraged to have physical activity at least one hour walk three times a week.

Statistical Analysis

Changes in the measured variables (anthropometric, bio-impedance, plasma lipids and lipoprotein measurements) were collected and statistically analyzed by using mean standard deviation and paired t-test to compare between before and after three months of treatment in the first intervention (electrolipolysis and low caloric diet) and their corresponding measurements in the second intervention (low caloric diet) at a confidence of 95% (α-level of 0.05).

RESULTS

The results of the present study showed that:

The anthropometric measurements:

Results post treatment revealed a statistically highly significant ($P<0.01$) decrease in weight and waist circumference, waist hip ratio and Body mass index for each group. While, comparing the results of both groups post treatment showed that group (B) was statistically significant ($P<0.05$) decrease in weight and Body mass index while, statistically highly significant ($P<0.01$) decrease in waist circumference, wait hip ratio than group (A) (Table 1).

Table (1): Shows the mean values and standards deviations of anthropometrics measurements in both groups.

			Mean	SD	x -diff	t-test	P value
weight (Kg)	Group (A)	pre ttt	96.02	9.46	12.02	22.29	Hs
		post ttt	87	6.3			
	Group (B)	pre ttt	95.88	9.07	12.48	21.29	Hs
		post ttt	80.4	6.34			
Waist circumference (cm)	Group (A)	pre ttt	96.72	4.66	14.02	24.29	Hs
		post ttt	85.56	5.28			
	Group (B)	pre ttt	96.76	4.68	13.02	22.29	Hs
		post ttt	80.28	3.16			
Waist hip ratio (%)	Group (A)	pre ttt	0.93	0.01	16.02	26.29	Hs
		post ttt	0.87	0.01			
	Group (B)	pre ttt	0.92	0.01	15.02	24.29	Hs
		post ttt	0.72	0.01			
BMI (Kg/m^2)	Group (A)	pre ttt	36.38	2.48	18.02	28.29	Hs
		post ttt	32.11	1.85			
	Group (B)	pre ttt	37.17	3.78	17.02	27.29	Hs
		post ttt	30.37	2.99			

x –diff: mean difference SD: standard deviation Hs: high significant P value: Level of Significant

The Plasma lipoprotein- lipids profile:

Post treatment results showed a statistically highly significant (P<0.01) decrease in Triglyceride and total cholesterol and low density lipoprotein while it was a statistically highly significant (P<0.01) increase in High density lipoprotein in both groups. Comparing post treatment results in both groups (A and B) showed that group (B) a statistically highly significant (P<0.01) decrease in triglyceride, total cholesterol and low density lioprotien than group (A). The difference between the two groups were not statistically significant (P>0.05) in high density lipoprotein [table (2)].

Table (2): Shows the mean values and standards deviations of Plasma lipoprotein- lipids profile before and after treatment in both groups.

			Mean	SD	x -diff	t-test	P value
Triglyceride (mg/dl)	Group (A)	Pre ttt	165.96	2.61	24.00	75.89	Hs
		post ttt	141.96	2.30			
	Group (B)	Pre ttt	166.96	4.03	29.16	43.36	Hs
		post ttt	137.80	2.87			
Total cholesterol (mg/dl)	Group (A)	Pre ttt	216.68	6.27	23.56	13.17	Hs
		post ttt	193.12	5.93			
	Group (B)	Pre ttt	213.40	7.76	39.12	24.94	Hs
		post ttt	174.28	2.95			
Low density lipoprotein (mg/dl)	Group (A)	Pre ttt	146.12	3.96	18.48	12.21	Hs
		post ttt	127.64	7.20			
	Group (B)	Pre ttt	145.68	4.42	26.56	15.45	Hs
		post ttt	119.12	8.62			
High density lipoprotein (mg/dl)	Group (A)	Pre ttt	46.16	2.34	-4.48	-11.96	Hs
		post ttt	50.64	2.34			
	Group (B)	Pre ttt	46.44	2.89	-4.92	-15.33	Hs
		post ttt	51.36	2.06			

x –diff: mean difference SD: standard deviation P value: Level of Significant
Hs: high significant mg/dl: milligrams/ deciliter

The bioelectrical impedance:

Post treatment results in group (B) showed a statistically highly significant (P<0.01) decrease in the percent of body fat and fat weight and a statistically highly significant (P<0.01) increase in percent of lean weight and basal metabolic rate the same results were obtained in groups (A). Comparing post treatment results in both groups (A and B) showed that group (B) a statistically highly significant (P<0.01) decrease in the percent of body fat and fat weight a statistically. While, the difference between the two groups were not statistically significant (P>0.05) in percent of lean weight and basal metabolic rate [Table (3)].

Table (3): Shows the mean values and standards deviations of bioelectrical impedance measurements pre and post treatment in both groups.

			Mean	SD	x -diff	t-test	P value
Percent of body fat (%)	Group (A)	pre ttt	42.48	5.33	10.64	25.39	Hs
		post ttt	31.84	4.63			
	Group (B)	pre ttt	40.98	4.19	10.66	26.70	Hs
		post ttt	28.32	4.98			
Fat weight (Kg)	Group (A)	pre ttt	43.09	8.36	14.22	18.36	Hs
		post ttt	28.87	5.26			
	Group (B)	pre ttt	40.28	8.57	14.76	19.23	Hs
		post ttt	23.53	5.52			
Lean weight (Kg)	Group (A)	pre ttt	57.69	4.48	-3.44	-5.81	Hs
		post ttt	61.13	4.94			
	Group (B)	pre ttt	54.66	5.96	-3.96	-5.10	Hs
		post ttt	59.62	2.87			
BMR (calorie)	Group (A)	pre ttt	1755.92	136.22	-104.28	-5.80	Hs
		post ttt	1860.20	150.16			
	Group (B)	pre ttt	1714.40	86.70	-67.84	-5.52	Hs
		post ttt	1852.24	83.81			

x –diff: mean difference SD: standard deviation P value: Level of Significant Hs: high significant

DISCUSSION

Mechanism eliminating the fat destruction through the ultrasound produce bubble in the tissue where the fat cells are applied, the bubble expands and then it is immediately compressed, then temperature increase due to the pressure sudden variation and the bubble implodes[6]. The implosion damages the fat cell, reducing the localized adiposity with the cavitation the fat cells are exposed to a pressure that breaks their membrane, unleashing the destruction of adipose fat deposits the fat contained (triglycerides) fragments into di glycerides is dispersed into the interstitial fluid among the cells and then cleared via the lymphatic system and transported through the vascular system to the liver. Where, fat metabolized by the lipase enzyme into glycerol and free fatty acids, Glycerol is phosphorylated and transported through the vascular system. The 3-free fatty acids are bound to each albumin molecule and transported to the liver. Fat metabolites were processed in the liver in the same manner as fat originating from digested fat. Therefore, the liver makes no distinction between fat coming from the cavitation and fat originating from consumed food both are expelled via the urinary system[14,17,29].

Obese women with a high accumulation of visceral adipose tissue tend to have hyper triglyceridaemia and low concentration of high density lioprotien cholesterol[2] furthermore; the reduction in plasma concentration of high density lioprotien cholesterol in these viscerally obese women is a major factor responsible for the increase in their ratio of cholesterol[8].

Obesity, particularly with central fat distribution being a powerful predictor of risk of coronary heart disease and mortality are directly related in middle-aged women. Many studies have shown that women in their midlife tend to gain weight, with a shift to visceral fat distribution[16].

This study was designed to determine the effectiveness of cavitation ultrasound

therapy and low caloric diet in reducing the body weight and visceral adiposity among perimenopausal obese women.

The results of the current study are in agreement with Brown and colleagues[6] who, studied the physics of focused external ultrasound using the and attempted to validate its efficacy in a porcine model. Gross and histologic evaluations of porcine adipose tissue after treatment with the device confirmed cavitation induced zones of injury in the adipose tissue with sparing of nervous and vascular structures as well as skin.

Our results corroborate those from Moreno-Moraga and colleagues[17] who conducted a prospective study in Spain involved 30 patients. Each patient underwent three treatments at 1-month intervals. Areas treated were the abdomen, inner and outer thighs, flanks, inner knees, and male breasts. Ultrasound measurements and circumference measurements were used to assess changes in fat thickness. They found that the mean reduction in fat thickness after 3 treatments was 2.28 to 0.80 cm, whereas the circumference was reduced by a mean of 3.95 to 1.99 cm. No significant changes in weight were identified to suggest changes as secondary to weight loss. Serum triglyceride levels and liver ultrasound evaluations for steatosis were also, performed for safety profiles, all of which showed no significant abnormalities. The group[17] reports treating more than 400 patients outside of the clinical study with successful reduction in localized adiposity and great patient satisfaction.

The results of cavitation ultrasound therapy group came in agree with Teitelbaum and colleagues[28] who performed a multicenter study (2 centers in the United States, 1 in the United Kingdom, 2 in Japan) involving 164 patients, 137 of whom had undergone a single treatment of focused external ultrasound lipolysis, whereas 27 served as controls. Follow-up was performed on days 1, 3, 7, 14, 28, 56 and 84. They reported a single contour treatment produced a mean reduction of approximately 2 cm in treatment area circumference and approximately 2.9 mm in skin fat thickness. No adverse effect was noted on lipid profiles or liver sonography. Complications were mild and included erythema, mild blistering in 2 patients, and mild dermal erosion in 1 patient that resolved by the end of the follow-up period.

The obtained results disagree with Shek and colleagues[27] who attempted to validate the results of prior studies in the Asian population, but found strikingly different results. Fifty-three patients had up to three treatments 1 month apart. Efficacy was assessed by changes in abdominal circumference, ultrasound fat thickness, and caliper fat thickness. A patient questionnaire was also used to assess satisfaction. Weight loss–induced measurements were also monitored. Shek and colleagues[27] found that here were no significant changes in any of the measurements before and after treatment. Patien satisfaction was also poor, because results were suboptimal. Shek and colleagues[27] attribute the discrepancy in results to body frame size of Southern Asians compared with Caucasians, suggesting that a modification in the transducer may alleviate the difficulties in delivery of ultrasonic energy on a smaller body habitus.

Regarding the results of anthropometric variables. The weight loss decrease in BMI in this study after low caloric diet may attributed to several mechanisms including, the diuriesis and depletion in stored glycogen and reduction in fat mass the depletion of fat depot caused by hydrolysis and clearance of triglyceride stored in adipose tissue into glycerol and free fatty acid (FFA) by the action of lipoprotein lipase (LPL) Després et al. (2001)[10]. Results of previous studies showed that more than a 10% reduction in body weight in a three months period of diet regimen Ellen et al. (2000)[11]. Other studies have reported similar weight losses in the range of 10 to 13 kg in obese women undergoing 16 weeks diet programs Berman et al. (2004)[3] and it was also reported that significant body weight losses, 14.5% compared to baseline over 16 week diet regimen Martin et al. (2001)[16].

Also, the decrement in Waist circumference and waist hip ratio may be explained by decrement in body fat mass in the abdominal region. It may also be related to regional change in LPL activity in the abdominal fat area. This lead to mobilization of FFA from centrally distributed adipose

tissue[14]. This is in agreement with Astrup and Rossner, (2002)[1] showed that post menopausal women appear to lose more fat from abdominal region during diet regimen. In contrast Clifton et al. (2002)[7] found that in obese post menopausal women, weight loss does not affect the regulation of regional fat metabolism and a greater tonic inhibition of basal lipolysis by endogenous adenosine that may increase the activity of adipose tissue LPL after weight loss and predispose older women to develop abdominal obesity. In addition, the results of this study showed a reduction of body fat mass in both group A and B.

The change in fat mass may be due to several possible mechanisms including, shifting in substrate utilization, decrease in proteolytic counter regulatory hormones and increase in lipo-protein lipase activity which could explain the change in fat mass[1].

In this study perimenopausal women showed high levels of plasma lipoproteins-lipids profiles before the study and their metabolism were significantly influenced by treatment programs. The noticed lowering in plasma lipids may be related to the postulated decreased synthesis of VLDL, which in turn lowers the formation of LDL in the plasma compartment or increase hepatic B/E receptor[31]. The increase in HDL is related to the strong negative association exists between plasma TG-rich lipoprotein and HDL cholesterol, manipulations that modify plasma TG will also affect HDL cholesterol concentration[16].

The results of the current study are also supported by Pricharha et al. (2003)[22] who postulated that weight loss over three months period lowered plasma concentration of LDL, TG, TC and raised plasma HDL. On the other hand, the results of this study contradict other studies reporting a negative correlation between BML WHR and blood lipids or between BMI and total cholesterol[9].

In conclusion, from the obtained results and discussion, it may be concluded that the cavitation ultrasound therapy and low calorie diet enhance the visceral adiposity in obese perimenopausal women.

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الملخص العربي

كفاءة الموجات فوق الصوتية التجويفية العلاج للدهون المتراكمة بالبطن

لدى السيدات البدينات قبل انقطاع الطمث

إنّ هناك أدلة واضحة على التأثيرات الضارّة للسمنة على صحة المرأة بصورة ساحقة وغير قابلة للجدال ويوجد حاليا اهتمام خاص بالسمنة الموضعية وخصوصا سمنة البطن وذلك لأنها لها كثير من المضاعفات على عدة أجهزه في الجسم وخصوصا الجهاز الدوري وذلك بما لها من تأثير على نسبة الدهون في الدم وكذلك على مرض السكري لأنها تؤثر على حساسية المريض للأنسولين الذي يفرزه الجسم وهذا النوع من السمنة يظهر في السيدات قبل انقطاع الطمث . **الهدف من الدراسة :** هو بحث ومقارنة تأثير الموجات فوق الصوتية التجويفية والنظام الغذائي منخفض السعرات الحرارية معا و برنامج النظام الغذائي منخفض السعرات الحرارية فقط على القياسات الإكلينيكية (الوزن - مؤشر كتلة الجسم - دوران الوسط- الدهون في الجسم) والقياسات المعملية (الدهون في الدم) لدى السيدات البدينات قبل انقطاع الطمث . اشترك في هذه الدراسة خمسون سيدة بدينه في مرحلة ما قبل انقطاع الطمث تعانى من سمنة موضعية بالبطن وتراوحت أعمارهم بين 37 ، 49 عاما وقد تم تقسيم السيدات المشاركات إلى مجموعتين متشابهتين . كلتا المجموعتين تكونت كل مجموعة من 15 مريضة وتم تقسيمهن عشوائيا . **القياسات :** تم قياس الوزن والطول ودوران الوسط و كمية الدهون، إلى جانب كمية الدهون في الدم في(قبل بداية ونهاية الدراسة) مدة الدراسة ثلاثة اشهر متتالية. المجموعة الأولى : تلقت النظام الغذائي منخفض السعرات الحرارية فقط خلال فترة الدراسة . المجموعة الثانية تلقت الموجات فوق الصوتية التجويفية والنظام الغذائي منخفض السعرات الحرارية وتلقت برنامج العلاج بمعدل جلستين أسبوعيا لمدة ثلاثة شهور . **النتائج :** بعد إجراء التحليل الإحصائي لم توجد فروق ذات دلالة إحصائية بين نتائج المجموعتين فبل العلاج ، بينما اثبت النتائج وجود فروق ذات دلالة إحصائية واضحة بمقارنة نتائج ما قبل وبعد الدراسة للمجموعتين . وكذلك أوضحت النتائج وجود فروق ذات دلالة إحصائية عالية لمجموعه (ب) عند مقارنة نتائج ما بعد العلاج للمجموعتين في نهاية البرنامج العلاجي . **الخلاصة :** من هذه النتائج يتضح أن استخدام الموجات فوق الصوتية التجويفية مع النظام الغذائي منخفض السعرات الحرارية له تأثير أفضل عن النظام الغذائي منخفض السعرات الحرارية فقط في علاج سمنة البطن .

الكلمات الدالة : السمنة - الموجات فوق الصوتية التجويفية - النظام الغذائي منخفض السعرات الحرارية - ما قبل انقطاع الطمث- سمنة البطن .