



Effect of Body Mass Index on Endometrial Thickness in Postmenopausal Asymptomatic Patients

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Abstract

Objective: To evaluate whether body mass index (BMI) is an important parameter that affects the thickness of the endometrium in asymptomatic postmenopausal women.

Methods: Our study was performed retrospectively using computer and file records of 434 postmenopausal women who were admitted to the Istanbul Research and Training Hospital Menopause clinic between June 2008 and April 2010. Endometrial thickness and biopsy results were compared among patients with endometrial thickness of >5 mm. The correlation between endometrial thickness and menopause age, BMI, diabetes mellitus (DM), hypertension (HT), and smoking were evaluated statistically.

Results: Statistically significant p-values were obtained between endometrial thickness and high BMI, DM, HT, and menopause age. Evaluation of the pathology results revealed atypical complex hyperplasia in one case (0.2%), endometrial polyp in 22 cases (5.1%), endometrial proliferation in 17 cases (3.9%), simple endometrial hyperplasia in four cases (0.9%), atrophic endometrium in 22 cases (5.1%), and endometrial secretion in 12 cases (2.8%).

Conclusion: We were determined that BMI is an important parameter that affects endometrial thickness and should be considered in follow-ups of endometrial pathologies of asymptomatic postmenopausal women.

Keywords: Postmenopause, body mass index, endometrial thickness

Introduction

Menopause is a physiological event involving the permanent cessation of menses because of the loss of ovarian function (1). The average age of menopause is around 48 years, according to the data of our country. It is very important to increase the awareness for a healthy life because of the increased risk of cancer and age-related diseases and for women in this period to benefit from preventive health services. Today, in developed countries, the most common cancer in the female genital tract is endometrial cancer. In particular, endometrial cancer, which is considered to be a disease of the postmenopausal period, was ranked fourth among all cancers in women. For the preliminary diagnosis of endometrial premalign-malign lesions and other pathologies transvaginal ultrasound (TVU) and the measurement of endometrial thickness are widely used (2). Cases whose endometrial thickness is smaller than 5 mm are reported to have very little possibility of endometrial cancer, and diagnostic curettage is not recommended in this group. The effects of obesity, which is a risk factor for endometrial cancer, on the endometrium are known. As a result of the aromatization of androstenedione to estrone in peripheral tissues, a proliferative effect occurs in the endometrium. In our study, we aimed to determine whether body mass index (BMI) is an important parameter that affects the thickness of the endometrium in asymptomatic postmenopausal women who were admitted to our menopause clinic.

Methods

Our study was performed retrospectively using computer and file records of 434 postmenopausal women who were admitted to the Istanbul Research and Training Hospital Menopause clinic for routine controls between June 2008 and April 2010. 434 women who had not menstruated for at least a year and had been admitted to our menopause clinic for routine controls were included in our study. Women with postmenopausal bleeding, women who have undergone hysterectomy, cases undergoing hormone replacement therapy (HRT), and patients with breast cancer who had been operated and had been using tamoxifen were excluded from the study. In our menopause clinic, all postmenopausal patients are routinely asked about their anamnesis, age, menopause age, number of pregnancies and births, diabetes, hypertension, gout, heart disease, depression, osteoporosis, surgeries if they had any, and medications they use. In addition, tobacco, alcohol, HRT, and tamoxifen use is investigated. Patients' BMI is calculated upon measuring their weight and height, their detailed systemic and gynecological examination is performed, and vaginal smear is con-

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ducted on those who have not had one in the recent year. Patients' routine biochemistry, lipid profile, hemogram, complete urinalysis, and TSH results were obtained from our hospital record systems. For all the patients' admitted to our clinic, TVU and endometrial thickness measurements are performed using the Chison 600 VET (Tokyo, Japan) ultrasound device in the longitudinal plane by measuring the double-wall endometrial thickness from the thickest point, and the cut-off value in endometrial thickness measurement is taken as 5 mm. Values higher than 5 mm are considered pathological, and dilatation and curettage are performed for histopathological evaluation for patients with endometrial pathology. Following hydrosopy, if necessary, hysteroscopy and/or dilatation curettage is performed on cases with endometrial polyp suspicion.

All the information recorded on the computer and in the files was examined. Endometrial thickness and pathologies of 78 cases whose endometrial pathology was detected via routine TVU were compared. On the other hand, the relationship between the risk factors for endometrial cancer and endometrial thickness was statistically assessed. Pathology results were divided into six groups, including atypical complex hyperplasia, simple endometrial hyperplasia, endometrial polyp without atypia, proliferation and secretion findings, and normal endometrial findings. To assess the relationship between endometrial thickness and BMI, BMI was divided into three categories: values from 18 to 24.9 as normal, from 25 to 29.9 as overweight, ≥ 30 as obese.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS, Chicago, Illinois) for Windows 10.0 was used. Comparisons were made using the chi-square method. $P < 0.05$ was considered significant.

Results

Of the 434 patients who were included in the study, 78 (18%) patients underwent dilation curettage because of postmenopausal endometrial thickness. Evaluation of the pathology results revealed atypical complex hyperplasia in one case (0.2%), endometrial polyp in 22 cases (5.1%), endometrial proliferation in 17 cases (3.9%), simple endometrial hyperplasia in four cases (0.9%), atrophic endometrium in 22 cases (5.1%), and endometrial secretion in 12 cases (2.8%). None of the cases were diagnosed with endometrial cancer.

When patients were evaluated according to their age, age at menopause, and the number of pregnancies and births, the average age for those who had endometrial thickness ≤ 5 mm was 55.45 ± 7.58 years, whereas the average age for patients with endometrial thickness ≥ 5 mm was 55.43 ± 7.67 years ($p = 0.078$).

Menopausal age in patients with endometrial thickness ≥ 5 mm was 48.69 ± 5.10 years and those with endometrial thickness ≤ 5 mm was 46.95 ± 4.91 years ($p = 0.008$). When the relationship between endometrial thickness and the number of pregnancies and childbirths was evaluated, no significant difference was detected in terms of the number of childbirths between the group with endometrial thickness ≥ 5 mm (3.31 ± 1.87) and the group with endometrial thickness ≤ 5 mm (3.01 ± 1.85) ($p = 0.075$). The number of pregnancies was found to be 5.12 ± 2.80 in the group with endometrial thickness ≥ 5 mm, whereas that in the group with endometrial thickness ≤ 5 mm was 4.81 ± 2.79 ($p = 0.076$).

The body mass index (BMI) of 20.7% of patients was < 25 , 37.1% of patients' BMI was in the range of 25–30, and 42.2% of patients' BMI was > 30 . Endometrial thickness was above 5 mm in 29.5% of the group with BMI > 30 , ($p = 0.008$).

In total, 20.5% of the patients were smokers. Endometrial thickness was statistically significantly lower in smokers (3.84 ± 2.35) than that in nonsmokers (4.45 ± 2.90). Although 9% of smokers showed an endometrial thickness ≥ 5 mm, this ratio was 21.7% in non-smokers ($p = 0.037$).

In total, 23.0% of our study group was diabetic. The endometrial thickness in 74% of diabetic patients was ≤ 5 mm, whereas the endometrial thickness in 26% of patients was ≥ 5 mm. The average endometrial thickness of the diabetic group was 4.80 ± 3.41 mm, whereas the average endometrial thickness in the group without diabetes was 4.18 ± 2.57 mm ($p = 0.007$).

In total, 58.5% of our study group was hypertensive. The endometrial thickness among 24.4% of the hypertensive group was ≥ 5 mm, whereas 11.7% of the non-hypertensive group showed a similar thickness. The average endometrial thickness in hypertensive patients was 4.56 ± 3.04 mm, whereas the average endometrial thickness in the non-hypertensive group was 3.99 ± 2.38 mm ($p = 0.033$).

In total, 13.8% of our study group was undergoing HRT. The endometrial thickness in 15% of those undergoing HRT was ≥ 5 mm, whereas 19.8% of those not undergoing HRT showed a similar thickness ($p = 0.043$).

Discussion

Endometrial cancer is important because it is seen in the postmenopausal period, and it is the most common gynecologic cancer. Although the detection of precancerous lesions and cancer in the early stages support the hypothesis that the clinical connections of asymptomatic lesions are still endometrial cancer (3), Koss et al. (4) indicated that the average asymptomatic duration of endometrial carcinoma development period is 4.2 years. Recently, it has been reported that endometrial thickness measurement performed via TVU can be used as a screening method in terms of premalignant lesions of endometrium cancer. The endometrial thickness, which was determined, is also compatible with histopathological diagnosis (5-8). The most important difference between these studies is to determine the safety margin of endometrial thickness, which can be determined using screening techniques. Performing endometrial biopsy is a widely accepted necessity in all women with postmenopausal bleeding or cases whose endometrial thickness is greater than 5 mm (9-13).

In our study, we compared the endometrial thickness that had been measured using TVU with various parameters in 434 asymptomatic postmenopausal women. Because the safety margin measured by TVU for endometrium thickness in endometrial cancer screening is generally considered as 5 mm, our study and control group were formed by taking the safety margin threshold as 5 mm (10, 14, 12).

The most important study that examined the relationship between BMI and endometrial thickness and suggested the presence of a

significant relationship between BMI and endometrial thickness is a prospective cross-sectional study conducted by Douche et al. (15) on the Japanese women population. This study, which included 212 cases, found a significant relationship between endometrial thickness and BMI. It was stated that this relationship was not dependent on the age and menopausal age. However, there are several studies that offer contrasting views on this subject.

Warming et al. (16), in a study that included 531 healthy postmenopausal women, showed a high positive correlation between BMI and endometrial thickness. Serin et al. (17) in a study conducted on a total of 182 postmenopausal women investigating the effects of obesity and hypertension on endometrial thickness concluded that only obesity increases endometrial thickness. In addition, although Andolf et al. (18) stated that there is a relationship between endometrial thickness and BMI, Van Der Bosch et al. (19) argued the opposite and claimed that neither BMI nor body weight is related to endometrial thickness.

The findings of Tsuda et al. (20), although the study was conducted on Japanese women, do not comply with those of Douche et al. (15) as well as ours. However, they particularly put emphasis on the women's age and menopausal age, and they stated that both parameters could have an impact on endometrial thickness. Berker et al. (21) in a study that involved 75 postmenopausal women could not find a statistically significant relationship between increased endometrial thickness and BMI. However, compared with the other group, patients having a lower BMI and diagnosed with atrophic endometrium is significant in terms of showing the effect of the peripheral estrogenic conversion.

Güven et al. (22), on the other hand, assessed the endometrial thickness and BMI correlation in 97 postmenopausal women. Patients' age, the period after menopause, and BMI were compared, and it was found that BMI was associated age and period after menopause, but no correlation with endometrial thickness was observed.

In our study, patients with high BMI were found to be having a significantly thicker endometrium. According to our results, no relationship was detected between age, number of pregnancies and childbirth, and endometrial thickness. These results are compatible with the study conducted by Lin et al. (23) in 1991.

Alcazar et al. (24) compared the endometrial thickness of asymptomatic postmenopausal hypertensive patients with normotensive patients, and a thicker endometrium was identified in hypertensive cases. In 1998, Pardo et al. (25) published the ultrasonographic endometrial results of asymptomatic postmenopausal women and determined that patients with hypertension were found to have a thinner endometrium.

Altıntaşoğlu et al. (26), in a study conducted in 2005 that included 27 hypertensive, 24 obese, and 20 healthy postmenopausal women, reported that in hypertensive and obese postmenopausal women, it is necessary to particularly perform endometrial thickness measurements, and pathological examination should be performed for cases whose endometrial thickness is greater than 5 mm.

In our study, we found a statistically significantly increased endometrial thickness in hypertensive patients. Diabetes is a major risk

factor for endometrial cancer. In our study, we found that endometrial thickness is significantly higher in diabetic patients.

When the period after menopause and the number of pregnancies and childbirths were examined in terms of increased endometrial thickness, no significant difference was detected. In a study conducted by Bao et al. (27) in 2002, it was reported that among smokers, benzopyrene increases the activity of the CYP1A1 enzyme in the estrogen metabolism of human endometrial cells. In a case-control study with 476 patients conducted by Baron et al. (28) in 1986, it was stated that increased smoking has a reducing effect on endometrial cancer risk, and according to the study that was conducted in 1990, smoking causes menopause at an early age by changing the estrogen metabolism and increasing the inactive forms of estrogen (29). According to the results of the study conducted by Byrjalsen et al. (30) in 1993, secretory endometrial proteins in endometrial estradiol and isocitrate dehydrogenase and serum tend to be lower in smokers. In 2010, Khorram et al. (31) revealed in a study investigating the effects of smoking on endometrial cells that smoking and nicotine inhibits the proliferation of endometrial cells by stimulating endothelial nitric oxide synthase in human endometrial cells. In our study, consistent with the literature, endometrial thickness was found to be significantly thinner in smokers.

Conclusion

In postmenopausal women, endometrial thickness is associated with BMI, diabetes, hypertension, smoking, and menopausal age.

Informed Consent: Written informed consent was not obtained from patients due to the retrospective nature of this study.

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