Correlation of postmenopausal endometrial changes determined by transvaginal sonography and histopathological analysis

Transvajinal ultrasonografi ile tanı konulmuş endometriyal değişikliklerin histopatolojik inceleme ile korelasyonu

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Abstract

Objective: The aim of this study was to determine the accuracy and usefulness of transvaginal sonography as a diagnostic method for determining pathological versus nonpathological changes in the endometrium, by comparing sonographic results with histopathological results following endometrial curettage.

Material and Method: This was a prospective study in 150 women, aged 45 to 70 years, who were hospitalized for different reasons at the Obstetric-Gynecology Clinic in Prishtina, Kosovo during 2007. Transvaginal sonography was performed in all 150 patients. Endometrial curettage was performed in 82 patients, and the tissues were sent for histopathological examination.

Results: More than one-third of the patients had an endometrial thickness between 3 and 10 mm. Within this group, histopathological examinations showed no evidence of any pathological changes. Meanwhile, in patients with an endometrial thickness >10 mm, the histopathological findings revealed hyperplasia, polyposis, carcinomas, and other pathologies. Changes in the form of atypical hyperplasia were present in 23% of the patients, and endometrial carcinoma was observed in 5% of patients.

Conclusions: The use of transvaginal sonography in combination with histopathology from endometrial curettage can improve the accuracy of pathological findings as well as the selectivity of the assessment of the endometrium in postmenopausal women.

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Key words: Postmenopausal endometrial changes, endometrial thickness, transvaginal sonography, histopathology analysis

Özet

Amaç: Bu araştırmanın amacı transvajınal sonografinin patolojik ya da nonpatolojik endometrium değişimlerında teşhis metodu olarak doğruluğunu ve kullanılabilirliğini belirlemektir. Bu sonografik sonuçlarla, endometrial küretajın histopatolojik sonucları kıyaslayarak yapmaktadır.

Gereç ve Yöntemler: Bu çalışma 2007 yıllı boyunca Prıshtına (Kosova)'da buluna Obstetrik- Jinekoloji kliniği'nde değisik nedenlerle yatan 45-70 yaş aralığındaki 150 kadın üzerinde yapılan prospektif bir çalışmadır. Transvajınal sonografi tüm 150 kadında yapılmıştır. Endometrial küretaj 82 hastaya yapılmış ve dokular histopatolojik incelmeye gönderilmiştir.v

Bulgular: Hastaların üçde birinden fazlasında endometrial kalınlık 3 ile 10 mm arasındaydı. Bu grubun içinde histopatolojık incelmede hiç bir patolojik değişiklik görülmemiştir. Bu arada endometrial kallınlığı 10 mm'den fazla olanlarda histopatoloji sonucunda hiperplazi, poliposis, karsinom ve başka patolojiler oluşmuştur. Değişikliklerin arasında atipik hiperplasi hastaların %23'ünde ve endometrial karsinoma hastaların %5 'inde gözlenmiştir.

Sonuç: Transvajinal sonografinin endometrial küretajın histopatolojisi ile kombinasyonu patolojik sonucların doğruluğunu gelistirdiği gibi postmenopozal kadınların endometriumun değerlendirilmesindeki seçiçiliğini yükseltir.

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Anahtar kelimeler: Postmenoposal endometrial değişiklikler, endometrial kalınlık, transvajinal sonografi, histopatolojik analiz

Introduction

The increased risk for endometrial carcinoma in women receiving postmenopausal hormone replacement therapy underscores the critical necessity for early detection of endometrial neoplasia (1). Transvaginal sonography is a noninvasive procedure for detecting changes in the endometrium and has been used as a screening method in asymptomatic postmenopausal women before or during hormonal replacement therapy (2).

Screening methods such as cervical or vaginal cytology are not sufficiently accurate for the detection of endometrial carcinoma, and direct intrauterine cell sampling and hysteroscopy are not practical screening methods because of their invasive nature (3).

Transvaginal sonography is useful for detecting and determining the extent of changes in the endometrium in patients who have undergone biopsy (endometrial thickness >4 mm), as well as for detecting other abnormalities of the pelvis in women reporting abnormal bleeding from the uterus. Advan-

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tages of transvaginal sonography as a screening method include that it is non-invasive, causes minimal stress for the patient, and can be performed without extensive preparation. Vaginal sonohysterography is used to obtain a better image the endometrium, allowing visualization of abnormal thicknesses, polyps, and leiomyomas, which are not usually detected by endometrial biopsy (4). In addition, the use of high ultrasonic frequencies provides a detailed, high-resolution image of the endometrial morphology (5). Many researchers prefer sonographic measurements of the maximum endometrial thickness as the sole diagnostic criteria of endometrial changes (6).

The thickness of the endometrium can vary considerably depending on several factors. It can be affected by obesity, diabetes, menopausal status, and hormone replacement therapy (estrogen alone or estrogen plus progesterone) (7). Furthermore, the progress or development from benign endometrial changes to hyperplasia is unknown (8). Although it is known that the proportion of simple hyperplastic and complex processes can be reversed, the time required for the reversal is not clear.

Endometrial cancer is becoming increasingly more common in women. The prognosis depends on the patient's age, histological structure, level of myometrial tumour invasion, invasion of cervix uteri, and metastasis to lymph nodes. Knowledge of these parameters is a precondition for choosing the best method of treatment (9).

Materials and Methods

A prospective study was carried out in 150 women, aged 45 to 70 years, who were hospitalized for different reasons at the Obstetric-Gynecology Clinic in Prishtina, Kosovo during 2007. Transvaginal sonography was performed in all 150 patients. Endometrial curettage was performed using Novak curettes in 82 patients, and the tissues were sent for histopathological examination. The procedure is performed under local anaesthesia with lidocaine 2% given in paracervical areas as office based procedure.

Transvaginal sonography was performed with the patient lying in a supine position. The maximum thickness of the endometrial echo was measured from one myometrial face to the other in the longitudinal section of the uterus, excluding the intracavitary fluid. In addition, endometrial homogeneity and echogeneity (with reference to the adjacent myometrium) were visualized as a central echo between endometrial interfaces. Four structural categories were visualized: (1) homogeneous low-echo, (2) homogeneous high-echo, (3) heterogeneous low-echo, and (4) heterogeneous high-echo.

For simplicity, the histological findings were divided into five categories: (1) normal for age group; (2) residual proliferation (weak endometrial proliferation); (3) hyperplasia (e.g., simple polyp, glandular polyp, glandular cystic polyp); (4) atypical adenomatous hyperplasia; and (5) endometrial carcinoma. The metric and morphological criterion's to assess the endometrium were: nonpathological, <6 mm and homogeneous low-echo; suspect, <6 mm and heterogeneous high-echo or >7 mm and heterogeneous low-echo; pathological, >7 m and heterogeneous high-echo, respectively.

Results

This prospective study included sonographic observations from 150 patients and histopathological observations from 82 of those patients. Table 1 shows the distribution of the thickness measurements in the 150 postmenopausal women. Postmenopausal women are more prone to endometrial changes, which show a greater correlation with the prevalence of endometrial cancer as women age. As seen in Fig. 1, 15% of the 45- to 49-year-old age group had endometrial cancer, whereas the rate in the 65- to 70-year-old age group was 39%.

In all suspect cases with an endometrial thickness >6 mm, endometrial curettage was performed. A higher proportion of patients in the subgroup with postmenopausal bleeding (61%) was examined by curettage, compared with the asymptotic group (39%). The histological changes identified in the 82 patients examined are summarized in Table 2. Atypical hyperplasia was present in 23% of the patients, and endometrial carcinoma was found in 5% of the patients.

Patients with an endometrial thickness of <3 mm showed histological findings of only residual endometrial proliferation. With increases in the endometrial thickness, nonpathological findings steadily decreased, and thicknesses >7 mm were associated with only pathological findings.

Discussion

In the present study, transvaginal sonography accurately identified the endometrial pathology in women with postmenopausal bleeding. It is also a principle method for selectively identifying women with menopausal bleeding who may require further examination by invasive methods such as endometrial biopsy (10).

Bleeding from the lower genital tract can occur from the cervix, vulva, or vagina. When the bleeding is attributable to a neoplasm, gross inspection is sufficient to identify these lesions. When cervical cytology findings are abnormal and no gross le-

Table 1. Thickness of the endometrium in postmenopausal women

Endometrial thickness	Number of patients (%)
<3 mm	41 (27.4)
3–10 mm	62 (41.3)
>10 mm	47 (31.3)
Total	150 (100)

Table 2. Histological changes of the endometrium in postmenopausal women

Histology	Bleeding, n	No bleeding, n	Total, n (%)
Normal	2	4	6 (7.3)
Simple hyperplasia	11	9	20 (24.4)
Endometritis	2	4	6 (7.3)
Chronic endocervicitis	3	3	6 (7.3)
Atypical hyperplasia	13	6	19 (23)
Endometrial polyp	7	3	10 (12.2)
Uterine leimyoma	8	3	11 (13.5)
Endometrial carcinoma	4	0	4 (5)
Total	50	32	82 (100)

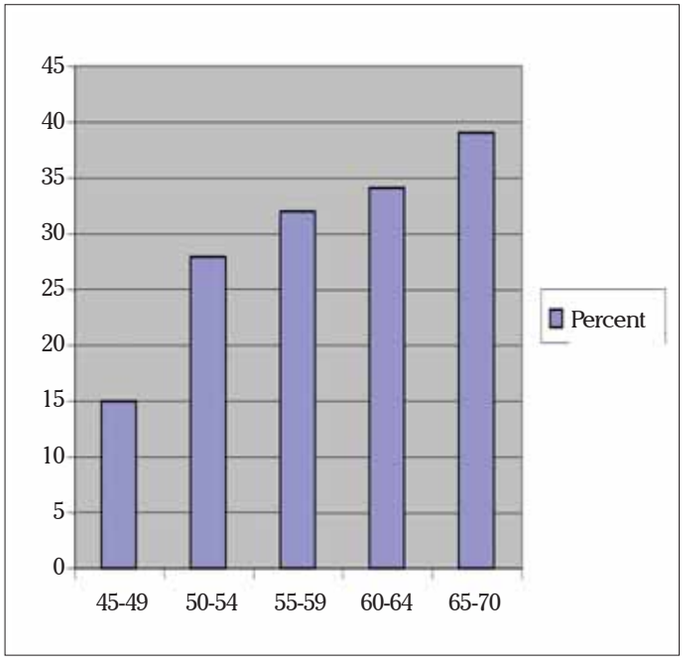

Figure 1. The number of patients with endometrial cancer increases with age

sions are identified, further evaluation must be performed. Atrophic changes in the vagina may lead to bleeding, particularly postcoital bleeding. Bleeding from the uterus may result from many types of benign lesions (e.g., polyps, endometritis) or hormone replacement therapy (11). Approximately 80% of endometrial carcinoma develops in the postmenopausal period. As menstrual or pregnancy alterations of the endometrium do not occur in postmenopausal women, maximum endometrial thickness on sonography is one of the main criteria used to evaluate the status of the endometrium in women of this age (12).

In our study, a thickness ≥10 mm was always associated with only histological pathology, which is consistent with findings of 10-11 mm for pathological endometrial thickness in other studies. We found normal observations and residual proliferation only in cases with an endometrial thickness of <3 mm. An endometrial thickness between 4 and 10 mm, which was found in more than one-third of the patients in the present study, is not necessarily indicative of either a normal or neoplastic endometrium in postmenopausal women. A focal point of our study was to determine whether an endometrial sonographic morphology assessment would provide reliable information for evaluating the endometrium in these women.

Assessment of the homogeneity and echogeneity of the endometrial image provided a significant contribution to our evaluation. Our results showed that a homogeneous low-echo image indicated nonpathological histology, whereas a heterogeneous high-echo image signified pathological findings. However, as non-measurable variables, these parameters are influenced by the individual assessment made by an examiner as well as the placement of the ultrasound equipment (13). Various terms, including heterogeneous, echo-turbulent, irregularly structured, echo-rich, and echo-dense, have been used to described polyps, endometrial hyperplasia, and carcinomas, whereas homogeneous and low-echo are uniformly used for atrophic or residual proliferative endometrium.

The determination of a central echo, based on a sonographic evaluation of the menstrual cycle, as a line separating the two symmetrical endometrial proliferative leaves can be affected by subjective assessments. Nevertheless, it was shown to be an important structural feature in the patients in our study. A central echo appeared only in cases of symmetrical atrophy or residual proliferation, and was absent in cases of histological pathology. This confirms previous findings of a central echo as a feature of atrophic or nonpathological endometrium, as reported by our group and others describe (14).

The use of echomorphological parameters for the prospective assessment of the postmenopausal endometrium is often rejected based on the argument that this method is too subjective and depends on the experience of the examiner. It is also difficult to transfer this expertise to other study groups. Using thickness measurements as the only objective criterion does not appear to be accurate in practice, because the boundary values used by different examiners can vary greatly. This is understandable given that the dimensions are in the millimetre range and the smallest deviation can have a substantial effect. One research group has shown that the deviations in endometrial sonographic biometers, which result from differences in the experience level of the observers, can reach significant levels. In comparison with differences in endometrial thickness, differences in the anterior-posterior diameter of the uterus would be of only mathematical value (15).

Based on the comparisons in the present study, incorporating sonomorphology into an endometrial assessment protocol would significantly increase the selectivity of the screening method because the measured results could be verified and compared with a visual image of the endometrium. When only a thickness measurement was performed, only every fourth patient could be evaluated as nonpathological or pathological. In contrast, using both metric and morphological criteria, a significantly higher number of patients were able to be referred for further examination. Another advantage of using sonomorphology is that patients with normal findings for their age group did not have to undergo unnecessary further examinations.

The criteria established by our work group represent only an initial proposal for sonographic endometrial assessment. In practice, this could be a two-phase concept: first, the determination of nonpathological or suspect findings based on thickness measurements; and second, the classification of the abnormalities using echomorphological measures. Additionally, the use of Doppler sonographic measurements would improve the evaluation of suspect findings (16). Given the current methods for grading and localizing endometrial carcinomas, the application of magnetic resonance is performed only for cases in which ultrasound has provided low quality images (17).

In postmenopausal women, sonographic assessment of the endometrium using the measurement of endometrial thickness as the sole criterion has been shown to be insufficient, and supplementary parameters are required. Based on our results, echomorphological measures can provide critical information for a conclusive diagnosis. We recommend using a combination of metric and morphological parameters when performing a sonographic assessment of the endometrium in postmenopausal women.

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