

## Correlation of Endometrial Thickness and Histopathology in Women with Abnormal Uterine Bleeding

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### Abstract

**Aim:** The study was aimed to reveal endometrial thickness measured by transvaginal sonography (TVS) and various clinical factors with histopathology in women with abnormal uterine bleeding and to evaluate the accuracy of transvaginal sonography in detecting intrauterine abnormalities as compared to hysteroscopy.

**Methods:** In this prospective study transvaginal sonography was performed in 163 women with abnormal uterine bleeding, followed within 48 hours by hysteroscopy and endometrial biopsy. Statistical analysis was performed by chi-square test and the various correlations were calculated.

**Results:** No statistically significant association was found between endometrial thickness and cycle day with histopathology. One of the women with endometrial thickness of <5 mm had malignancy. There was a highly significant association between menstrual status and histology. Transvaginal sonography and hysteroscopy were in agreement in 79.14% of the patients.

**Conclusions:** 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. Endometrial biopsy should be performed to exclude endometrial hyperplasia and carcinoma in postmenopausal women with endometrial bleeding to perform proper and prompt treatment, especially in old aged women.

**Keywords:** Postmenopausal endometrial changes; Endometrial thickness; Transvaginal sonography; Histopathology analysis

### Introduction

Postmenopausal bleeding is a clinically important complaint in general gynecologic practice. The incidence of spontaneous postmenopausal bleeding in the general population is approximately 10% immediately after menopause, and 5% in all menopausal women. Various benign genital causes of postmenopausal bleeding include atrophic vaginitis, endometrial and cervical polyps, endometrial hyperplasia [1,2].

Endometrial cancer is the most common gynecological malignancy and the fourth most frequent site of malignant neoplasm in females [3]. Endometrial cancer comprises only 1.9% of all types of cancer in increasing trend along with the average lifespan [4].

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 [5]. 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 [6].

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. A review of literature shows only a few studies combining the endometrial thickness, cycle day, hysteroscopy findings and histology.

The study was aimed to reveal the histopathologic diagnosis of postmenopausal uterine bleeding, and to investigate the relation between various clinical factors and endometrial thickness.

### Materials and Methods

From December 2012 through August 2015, all 205 women who visited the Obstetrics and Gynecology Departments of MAGS Medical & Research center with a chief complaint of abnormal postmenopausal vaginal bleeding were recruited.

Among them, 163 patients were evaluated for prospective correct diagnosis for the bleeding after excluding patients who had systemic and hematologic disorders, previous endometrial diagnosis, or vaginal bleeding due to disorders in the pelvis other than the uterus. Informed consent was taken from all the patients. Patients were divided into 3 groups – i) menstruating, ii) perimenopausal and iii) postmenopausal. Age, parity and presenting symptoms were recorded. The ethical approval for the further evaluation and use of data was granted by the Institutional ethical committee. They underwent transvaginal ultrasonographic scanning as the initial investigation tool to evaluate the endometrium.

Endometrial thickness was measured at the thickest part in the longitudinal plane and included both endometrial layers from one basalis to the contralateral basalis including the uterine cavity.

Endometrial tests were performed by cervical dilatation and curettage in subjected women after signed informed consents. The endometrial specimens were reviewed by an expert pathologist for the diagnosis. The cycle day on which the sonography was performed was recorded along with any other detected uterine abnormality.

## Results

A total of 163 patients completed the study. The distribution of patients according to their age and parity is shown in Figure 1. Menorrhagia was the most common presenting symptom in 97 women (59.51%), metrorrhagia in 49 women (30.06%) and 17 women (10.43%) were postmenopausal (Table 1).

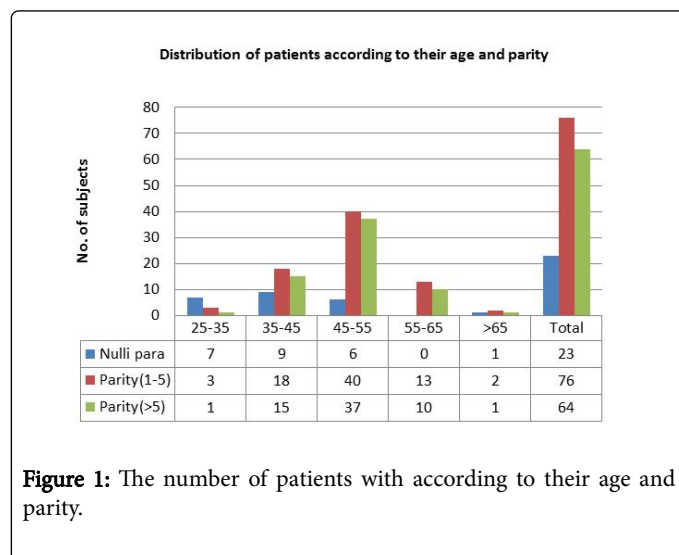


Figure 1: The number of patients with according to their age and parity.

Histology	Menstrual (<45 yrs)	Peri-menopausal	Post-menopausal	Total
Proliferative Em	37	14	4	55
Secretory Em	25	17	1	43
Polyp	14	9	1	24
Atrophy	9	3	7	19
Hyperplasia	10	4	1	15
Endometritis	2	1	2	5
Cancer of Em	0	1	1	2
				163
Em: endometrium				

Table 1: Endometrial histology in the various menstrual groups.

The correlation between endometrial thickness and histology is shown in Table 2. Patients were divided into seven groups based on endometrial thickness and histopathology. Fifty-five women had a proliferative endometrium, secretory endometrium in forty-three

women, 15 women had hyperplasia, 19 had atrophy, 24 women had and two women had cancer of endometrium (Table 2).

The endometrial thickness ranged from 2.5-25.5 mm. Forty-nine women were examined in the first half of the menstrual cycle and 26 of them had proliferative endometrium. Twenty-two women were examined in the second half of the cycle and 10 of them had proliferative endometrium. 26 women had prolonged cycles and 17 were postmenopausal (Table 3). In all the groups, proliferative endometrium was the most common histological pattern.

Histology	Endometrial Thickness (mm)					Total
	<5	05-10	11-15	16-20	>20	
Proliferative Em	3	27	21	4	0	55
Secretory Em	1	19	21	1	1	43
Polyp	7	1	16	0	1	24
Atrophy	12	2	3	2	0	19
Hyperplasia	4	1	7	3	0	15
Endometritis	0	3	1	1	0	5
Cancer of Em	1	0	0	0	1	2
						163
Em: endometrium						

Table 2: Correlation between endometrial thickness and histology.

Histology	Cycle day			Post-menopausal	Total
	< 14	15-30	> 30		
Proliferative Em	26	10	7	4	47
Secretory Em	10	8	9	1	28
Hyperplasia	5	2	1	1	9
Atrophy	0	2	4	7	13
Polyp	7	0	4	1	12
Endometritis	1	0	1	2	4
Cancer of Em	0	0	0	1	1
					114
Em: endometrium					

Table 3: Correlation between histology and cycle day (exclude patients with metrorrhagia (163-49=114)).

The endometrial histology seen in menstruating, perimenopausal and postmenopausal women is shown in Table 1. Most of our patients i.e., 97 women, were in the menstruating group. Transvaginal sonography (TVS) and hysteroscopy findings were in agreement in 129 cases (79.14%). Of these, 97 women had normal hysteroscopy and TVS findings and 32 women had abnormal findings on both TVS and hysteroscopy. In the remaining 34 women, hysteroscopy and TVS findings did not correlate. 27 women with normal TVS had some

endometrial abnormalities detected by hysteroscopy. Seven patients with abnormal TVS did not have any abnormality on hysteroscopy, probably due to thickened endometrium being mistaken for a fibroid.

## Discussion

Abnormal uterine bleeding is a common problem of all gynecological consultations in the menopausal years [7]. The main aim of investigating these women was to rule out endometrial cancer and its precursor lesion and endometrial hyperplasia. The probability of endometrial cancer in women presenting with postmenopausal bleeding is 10% and approximately 15% for endometrial hyperplasia. The prevalence of benign intrauterine structural pathology (example, endometrial polyps) found in association with bleeding was 25% [8,9]. For many years, diagnostic curettage has been the method of choice to diagnose endometrial abnormalities [10]. Hysteroscopy combined with histologic examination subsequently became the "gold standard" for such evaluation [11]. Currently, the focus has shifted to TVS as a simple, non-invasive alternative method to hysteroscopy and curettage [12]. The advance of high resolution transvaginal probes has revolutionized the ability to visualize the endometrium. Transvaginal sonography is an accurate instrument for the evaluation of the endometrium in menstruating as well as postmenopausal women. The use of TVS has reduced risks and burden to patients, as well as costs. In the Nordic Trial, where over 1100 postmenopausal women were evaluated, it was found that for a cut-off value of endometrial thickness of 4 mm, the sensitivity was 96% and specificity was 68% to detect endometrial abnormalities (polyp, hyperplasia, and carcinoma). In menstruating women, the endometrial thickness increases gradually and measures 10-12 mm by the day of ovulation and increases further up to 16 mm by the mid-luteal phase. However, there is a lack of clear cut-off criteria for abnormal endometrial thickness for pre-menopausal women. In the present study of 163 women with abnormal uterine bleeding ranging in age from 25-75 years, we did not find any statistically significant correlation between endometrial thickness and histopathology, but one of the patients with endometrial thickness <5 mm had endometrial cancer. There was no significant association between cycle day and abnormal histology. A highly significant association between menstrual status and histopathology was found in our study as expected. The sensitivity of TVS can be improved greatly by saline infusion sonography [13]. The percentage of abnormal findings detected by hysteroscopy was 37.6% and 29.7% for TVS. This difference is statistically significant ( $p < 0.05$ ). The results demonstrate the superiority of hysteroscopy over TVS for the exclusion of intrauterine abnormalities in women with abnormal uterine bleeding. An endometrial thickness of <5 mm in women with postmenopausal bleeding could mean that curettage could be avoided. No definite cut-off value can be assigned for the menstruating women. Transvaginal sonography is a good initial screening tool in the evaluation of women with abnormal uterine bleeding. Transvaginal sonography seems to be an effective procedure to exclude endometrial and intrauterine abnormalities.

## Conclusions

Based on our results, echo-morphological 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. Endometrial biopsy should be performed to exclude endometrial hyperplasia and carcinoma in postmenopausal women with endometrial bleeding to perform proper and prompt treatment, especially in old aged women.

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The authors gratefully thank all the couples participating in the study.

## Conflict of Interest

There was no conflict of interest in this study.

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