

Role of Transvaginal Ultrasound of endometrial thickness and Doppler of uterine artery in cases of postmenopausal bleeding

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Abstract.

Objectives : To determine the role of trans-vaginal color Doppler of uterine arteries and endometrial thickness in a women with postmenopausal bleeding.

Methods: This study is cross sectional observational study was conducted in the Department of Obstetric and Gynecology Department at El-Gomhoria Hospital during the period from October 2015 to May 2016.. It was carried out on Postmenopausal patients. Prior to endometrial biopsy, the patients underwent a baseline trans-vaginal ultrasound screening. The vascular indices and endometrial thickness were calculated and compared with the endometrial histopathology.

Results: Taking 5 mm endometrial thickness as a cut-off value in our study 4 patients had an endometrial thickness <5 mm (atrophic endometrium) and 26 patients had an endometrial thickness >5 mm Using this cut-off value in our study, trans-vaginal ultrasound showed a sensitivity of 100%, specificity of 66.6%, positive predictive value of 81.8%, and negative predictive value of 100%. Taking 0.85 Uterine Artery RI as a cut-off value in our study trans-vaginal Doppler showed a sensitivity of 94.7%, specificity of 83.3%, positive predictive value of 89.4% and negative predictive value of 90.9%

Conclusions: The study emphasize the importance of the combined examination using both techniques to increase the diagnostic accuracy and Fractional curettage is still needed in cases with postmenopausal bleeding for the diagnosis or the exclusion of definite endometrial pathology.

Introduction

Menopause is defined as the permanent cessation of menses for more than one year and is physiologically corelated with the decline in estrogen secretion resulting from the loss of follicular function. Its time is genetically determined and occurs at a median age of 51 years. (*William et al., 2002*)

So postmenopausal bleeding is defined as bleeding from the genital tract after the cessation of menstruation for more than one year. It is one of the most common problems affecting women after menopause.

Its main causes are the use of exogenous estrogen as a hormonal replacement therapy, atrophic endometritis and vaginitis, endometrial cancer, endometrial or cervical polyp, endometrial hyperplasia and miscellaneous (e.g, cervical cancer, uterine sarcoma, urethral caruncle, trauma) (*Konar and Dutta, 2013*).

Diagnosis of the causes of postmenopausal bleeding can be made by transvaginal sonography, Doppler and fractional curettage are the most important. Using the transvaginal ultrasonography for detecting endometrial disease have been considered a high sensitive test but carries a false negative rate of 8%. Recent reports

showed that the combined assessment of the endometrial thickness with some morphologic parameters improve the diagnostic accuracy of transvaginal ultrasonography in patients with postmenopausal bleeding (*Starzewski et al., 2005*). Doppler sonography is a non invasive technique that uses high frequency sound for investigation of the blood flow. Doppler velocimetry with a possibility of analyzing vascular changes in the female pelvis, and/ or blood flow at the level of large as well as smaller uterine blood vessels, and color angiogenic changes at the myometrium and endometrium level, presents a new and important diagnostic dimension in the evaluation of abnormal uterine bleeding, in particular old women (*Dragojevic et al., 2005*).

The normal postmenopausal endometrium should appear thin, homogeneous, and echogenic. There is controversy regarding endometrial thickness with menopause. Although some authors have found that endometrial thickness decreases with age, others believe there is no statistically significant change during menopause (*Nalaboff et al., 2001*).

The histopathological diagnosis obtained by curettage has been used as a gold standard for distinguishing between normal and pathological endometrium although it has a false negative rate of 1-10% due to failure of sampling of the whole cavity (*Van den Bosch et al., 2005*).

Methods

This study is cross sectional observational study was conducted in the Department of Obstetric and Gynecology Department at El-Gomhoria Hospital during the period from October 2015 to May 2016.. It was carried out on Postmenopausal patients. Prior to endometrial biopsy, the patients underwent a baseline trans-vaginal ultrasound screening. The vascular indices and endometrial thickness were calculated and compared with the endometrial histopathology. .

Results

Table (1): Histopathological findings in the study group

	Endometrial thickness		Frequency
	< 5 mm	≥ 5 mm	
Atrophic Endometrium	4	0	4
Proliferative Endometrium	0	4	4
Secretory changes	0	4	4
Endometrial polyp with hyperplasia	0	4	4
Simple Endometrial hyperplasia	0	11	11
Endometrial carcinoma	0	3	3
Total	4	26	30

Table (2) Endometrial Thickness in endometrial hyperplasia cases & control group

	Endometrial thickness
Endometrial hyperplasia	
Mean ±SD	14.60 ±3.96
Median	12
Control group	
Mean ±SD	4.62 ±0.91
Median	4.45
P Value (significant)	<0.001

Table (3) Endometrial thickness in endometrial carcinoma cases & control group

	Endometrial thickness
Endometrial carcinoma	
Mean ± SD	9.67 ±1.10
Median	10.20
Control group	
Mean ± SD	4.62 ±0.91
Median	4.45
P Value (significant)	0.011

Table (4) : Doppler parameters of the Rt. Uterine artery in endometrial hyperplasia cases & control group

	Rt. Uterine PI	Rt. Uterine RI	Rt. Uterine S/D
Endometrial hyperplasia			
Mean \pm SD	1.65 \pm 0.28	0.75 \pm 0.08	7.05 \pm 2.83
Median	1.72	0.76	5.74
Control group Mean \pm SD	1.82 \pm 0.45	0.82 \pm 0.14	9.05 \pm 6.69
Median	1.63	0.81	6.44
P Value	0.121	0.032*	0.167

Table (5) : Doppler parameters of the Rt. Uterine artery in endometrial carcinoma cases & control group

	Rt. Uterine PI	Rt. Uterine RI	Rt. Uterine S/D
Endometrial carcinoma			
Mean \pm SD	1.45 \pm 0.39	0.58 \pm 0.01	2.17 \pm 0.30
Median	1.23	0.58	2.31
Control group Mean \pm SD	1.82 \pm 0.45	0.82 \pm 0.14	9.05 \pm 6.69
Median	1.63	0.81	6.44
P Value	0.180	0.006*	0.089

Table (6) : Sensitivity, Specificity, +ve predictive value of endometrial thickness 5 mm & uterine artery RI 0.85 as acut-off value to detect endometrial pathology

	Sensitivity	Specificity	+ve predictive value	-ve predictive value
Endometrial thickness 5 mm	100%	66.6%	81.8%	100%
RI 0.85	94.7%	83.3%	89.4%	90.9%

Discussion

As regards the results of transvaginal ultrasound in this study:

First, we found that there were significant difference between the study and the control groups regarding to the uterine length ($p < 0.001$) and uterine width ($p < 0.001$)

Next, the most important sonographic parameter to be studied was the endometrial thickness. This was done by measuring a double layer endometrial thickness, by performing the measurement between the two basal layers of the anterior and posterior uterine walls. The poorly reflective layer surrounding the highly reflective endometrium was not included in the measurement.

When the endometrial layers were separated with fluid, both layers were measured and the sum was recorded.

We found that there was significant difference between the study and the control groups regarding to the endometrial thickness ($p < 0.001$)

It was found that there were significant difference between the endometrial hyperplasia cases & control group regarding to the uterine length, width and endometrial thickness ($p < 0.001$).

Taking 5 mm endometrial thickness as a cut-off value in our study:

It was found that, in the study group, 4 patients of a total number of 30 patients had an endometrial thickness < 5 mm (atrophic endometrium)

It was found that the 26 patients had an endometrial thickness > 5 mm. 4 of them had proliferative endometrium, 4 had secretory changes, 4 had endometrial polyp with hyperplasia, 11 had simple endometrial hyperplasia and 3 had endometrial carcinoma .

Using this cut-off value in our study, transvaginal ultrasound showed a sensitivity of 100%, specificity of 66.6%, positive predictive value of 81.8%, and negative predictive value of 100% .

As regarding the results of Doppler velocimetric study of the uterine artery in this study:

In our study, it was first found that there was no significant difference between the study and control groups regarding to the right uterine PI, right uterine RI, right uterine S/D. $P = 0.379$, 0.309 and 0.148 respectively

It was also found that there was no significant difference between the study and the control groups regarding to the left uterine PI, left uterine RI, left uterine S/D. $P = 0.287$, 0.140 and 0.120 respectively

However, it was found that there were significant difference between the endometrial hyperplasia cases & control groups regarding to the right uterine RI ($P = 0.032$) and left uterine RI ($P = 0.018$)

Also, it was found that there were significant difference between the endometrial carcinoma cases & control groups regarding to the right uterine RI ($P = 0.006$) and left uterine RI ($P = 0.002$)

Taking 0.85 Uterine Artery RI as a cut-off value in our study:

Using this cut-off value in our study, transvaginal Doppler showed a sensitivity of 94.7%, specificity of 83.3%, positive predictive value of 89.4% and negative predictive value of 90.9%

Conclusions and Recommendations

1. Transvaginal ultrasonography is a simple non-invasive diagnostic method that can be used in detecting abnormal endometrium in patients with postmenopausal bleeding. Doppler velocimetric study of the uterine artery offers another simple non-invasive valuable method in screening cases of postmenopausal bleeding.
2. The present study emphasize the importance of the combined examination using both techniques to increase the diagnostic

accuracy and to decrease as much as possible the false results that may occur in either of them alone.

3. It is recommended to take 5 mm endometrial thickness and 0.85 uterine artery RI as a cut-off value to detect endometrial pathology.
4. Fractional curettage is still needed in cases with postmenopausal bleeding for the diagnosis or the exclusion of definite endometrial pathology.

References

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