



## To What Extent Doppler Transvaginal Sonography can be Reliable in Pre and Postmenopausal Women with Abnormal Uterine Bleeding?

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DOI: 10.24896/jrmds.20175411

### ABSTRACT

The current study was to assess the efficacy of gray scale and power Doppler transvaginal ultrasound in management of patients referred with abnormal uterine bleeding (AUB). This prospective analytical observational cross-sectional study performed from 2015 to 2016 to evaluate 120 women (15% premenopausal and 85% postmenopausal) with abnormal uterine bleeding in Alzahra hospital, Isfahan, Iran. The patients were classified according the AUB diagnosis to endometrial atrophy, hypertrophy, cancer and polyp. Dilatation and curettage (D&C) in polypoid lesions, focal thickening, mass and the endometrial pipelle sampling, in homogenous endometrium was done. After applying inclusion and exclusion criteria as the cases were evaluated with ultrasonography transvaginal scan (TVS). Histopathological correlation was done in all cases. The mean endometrial thickness in atrophic endometrium, hyperplasia, polyp and endometrial carcinoma were <4 mm, 15-18 mm, 15-18 mm, and >18 mm, respectively which was a significant difference between normal endometrium and carcinoma ( $P$ -value<0.05). Heterogeneity of endometrium was not diagnostic of endometrial cancer; however vessels in endometrial cancer were more prominent. TVS can be safely used as an imaging technique in the management of abnormal uterine bleeding. TVS has good accuracy and positive predictive value in diagnosis of endometrial cancer with endometrial thickness less than 4mm and good accuracy in diagnosis of atrophic endometrium.

**Key words:** Transvaginal ultrasound, abnormal uterine bleeding, Doppler ultrasound, endometrial cancer.

**HOW TO CITE THIS ARTICLE:** Milad Vakili Zarch, Mahshid Haghighi, Fariba Behnamfar, Sahar Rabbani, To What Extent Doppler Transvaginal Sonography can be Reliable in Pre and Postmenopausal Women with Abnormal Uterine Bleeding?, J Res Med Dent Sci, 2017, 5 (4):62-65, DOI: 10.24896/jrmds.20175411

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**Received:** 15/08/2017

**Accepted:** 20/09/2017

### INTRODUCTION

Abnormal uterine bleeding (AUB) is considered as one of the most common presentations in the acute gynecology unit, which means any significant deviation from established menstrual cycle or postmenopausal bleeding [1]. Transvaginal ultrasound (TVS) with color doppler is the cornerstone of initial management which can reliably exclude the most common intracavitary pathologies including endometrial polyps and submucosal fibroids [2]. Vaginal sonography is preferred over uniform biopsy since it is a less invasive procedure, generally painless with no complications and may be more

sensitive for detecting carcinoma than blind biopsy [3].

Approximately 10% of post-menopausal AUB consists of endometrial cancer which is the most common gynecologic malignancy [4-6]. Post-menopausal bleeding is the most common symptom of endometrial cancer [7]. In postmenopausal women the normal endometrium is thin (4-5 mm thickness) and endometrial cancer is characterized by a significant increase in the thickness of the endometrium [2]. Although, endometrial thickness measured by transvaginal ultrasonography, is not sufficient in predicting premalignant and malignant endometrial polyps [8]. Since the vast majority of endometrial polyps are benign, a systematic removal of all incidentally diagnosed polyps may not be appropriate [5].

The aim of this study was to assess the efficacy of gray scale and power Doppler transvaginal ultrasound in management of patients referred with AUB.

#### MATERIAL AND METHODS

This prospective analytical observational and cross sectional study conducted from 2015 to 2016 to evaluate 120 women (15% premenopausal and 85% postmenopausal) with abnormal uterine bleeding referred to Alzahra hospital, Isfahan, Iran. The study was approved by the ethical committee of Isfahan University of Medical Sciences, Isfahan, Iran. Informed consent was obtained from all patients. Inclusion criteria were 40-70 years old pre and postmenopausal women with new onset AUB and exclusion criteria were pregnancy, being on tamoxifen or hormone replacement therapy (HRT). After taking history and general physical examination, gray scale and power Doppler TVS was performed with 5 MHz endovaginal transducer mindray. Endometrial thickness (ET), polyploid lesions, heterogeneity and vascularity were evaluated. The patients were classified according the AUB diagnosis to endometrial atrophy, hypertrophy, cancer and polyp. Dilatation and curettage (D&C) in polypoid lesions, focal thickening, mass and the endometrial pipelle sampling was done in homogenous endometrium. If the endometrial thickening in late postmenopausal women was less than 5mm, follow up was recommended. All the pathology samples were evaluated by a board certified pathologist. The patients were classified again according the pathology findings.

#### Statistical analysis

Statistical analysis was performed via SPSS 20 and P value<0.05 was considered as significant. T-test and chi square ( $\chi^2$ ) tests were used for TVS and histology findings. Continuous data were expressed as mean $\pm$  SD and categorical data were denoted as numbers or percentages.

#### RESULTS

This study included 120 women with the mean age of 40-50 years for premenopausal and 52-54 years for postmenopausal. The histopathologic diagnosis is shown in table1. In 10% of patients with endometrial atrophy, multiple cystic lesions with false thick endometrium up to 18mm without vascularity were observed. In one case of endometrial atrophy with thickness of 4.5mm without vascularity, carcinomatous cells were detected.

The mean endometrial thickness in atrophic endometrium, hyperplasia, polyp and endometrial carcinoma were <4 mm, 15-18 mm, 15-18 mm, and >18 mm, respectively. There was a significant difference in the mean endometrial thickness between normal endometrium and carcinoma (P-value<0.05) (Table 2).

Subendometrial hypoechogenicity was prominent in carcinoma and also in 20% of cases with endometrial atrophy with no significant difference between the two (p <0.05). 40% of cases with endometrial hyperplasia had heterogeneity and other cases had homogenous thickening. So heterogeneity of endometrium was not diagnostic of endometrial cancer. Vascularity flow in 10% of endometrial hyperplasia had diffuse heterogenous pattern and resistance index was similar to cancer (0.2-0.5) (p=0.71); However, vessels in endometrial cancer were more prominent.

Polypoid lesions was observed in 25% of patients, which 92% of them were larger than 10mm with one vascular pedicle in many of them (none of them was endometrial cancer), diffuse vascular vessels and vascular pedicle in 2% and no vascular flow in 8% of cases. 3% of polypoid lesions were endometrial cancer with lobulated border and diffuse vascular flow (0.2-0.5)

**Table 1: Histopathologic diagnosis in studied patients**

Histopathologic diagnosis	Number	Percent
Atrophy	66	60%
Polyp	11	25%
Hyperplasia	12	10%
Cancer	6	5%

**Table 2: Distribution frequency of endometrial findings according to endometrial thickness in studied patients**

Endometrial findings (%)	Endometrial thickness(mm)				
	<4	4-10	10-15	15-18	>18
Atrophy	55%	5%	-	-	-
Hyperplasia	-	3%	-	7%	-
Endometrial polyp	6%	6%	4%	9%	-
Endometrial carcinoma	-	1%	-	1%	3%

## DISCUSSION

In the current study most of the postmenopausal women with AUB had endometrial thickness of 1-4 mm with mean  $\pm$  SD of  $7.74 \pm 7.04$  which matched with the study done by Kadakola *et al* [9, 10]. Six of the cases with endometrial thickness of 4-10 mm had endometrial atrophy histopathologically. These findings are similar to the results of Kaur *et al* and Kadakola *et al*. In 8% of our subject focal endometrial hyperplasia in TVS, which 40% of them were endometrial polyp and 60% hyperplasia histologically. These findings were close to the results of Kaur *et al* and Kadakola *et al* [10, 11].

Ultrasonography showed sensitivity of 38% and specificity of 80% with accuracy of 86% in diagnosing polyp in the current study. USG diagnosed endometrial cancer, in the current study with 100% sensitivity and specificity along with histology as gold standard. There was significant correlation between USG and histological diagnosis of atrophic endometrium (100% sensitivity and 84% specificity with accuracy of 100%). This was close to the results of Hunter *et al* [11].

Endometrial atrophy was diagnosed via TVS in 66 patients who chose to the results of the studies done by Karlsson *et al*, Kaur *et al* and Osmer *et al* [12-14].

The sensitivity of TVS in diagnosis of endometrial diseases in the study was 95% and the specificity 79.3%. The positive predictive value (PPV) was 82%, the negative predictive value (NPV), was 96% and the accuracy was 83%. These results are matched with the findings of the studies which done in previous research (sensitivity of 100%, specificity of 60%, NPV of 100%) [9, 15-17]. Therefore present study shows no need for further evaluation in patients when endometrial thickness is less than 4 mm.

Some researchers have remarked that endometrial echotexture may help to differentiate carcinoma from polyps and hyperplasia [8].

Adding morphologic characteristics to the assessment can increase the specificity and negative predictive value of sonography [18]. According to our results, TVS showed good accuracy in diagnosis of endometrial malignancy & atrophy as well as acceptable accuracy in diagnosis of endometrial polyp.

Overall, TVS can be safely used as an initial and noninvasive imaging technique in the management of abnormal uterine bleeding for detection of endometrial pathology. TVS has good accuracy and positive predictive value in diagnosis of endometrial cancer with endometrial thickness less than 4mm and good accuracy in diagnosis of atrophic endometrium.

## Conflict of interest

None to declare

## Acknowledgment

This study was supported by Isfahan University of Medical sciences, Iran (Approved No. 395568).

## REFERENCES

1. Williams PL, Laifer-Narin SL, Ragavendra N. US of abnormal uterine bleeding. *Radiographics*. 2003;23(3):703-18.
2. Stachowiak G, Zajac A, Pertynska-Marczewska M, Stetkiewicz T. 2D/3D ultrasonography for endometrial evaluation in a cohort of 118 postmenopausal women with abnormal uterine bleedings. *Ginekologia Polska*. 2016;87(12):787-92.
3. Davidson KG, Dubinsky TJ. Ultrasonographic evaluation of the endometrium in postmenopausal vaginal bleeding. *Radiologic Clinics of North America*. 2003;41(4):769-80.
4. Aboul-Fotouh ME, Mosbeh MH, El-Gebaly AF, Mohammed AN. Transvaginal power Doppler sonography can discriminate between benign and malignant endometrial conditions in women with postmenopausal bleeding. *Middle East Fertility Society Journal*. 2012;17(1):22-9.

5. Bignardi T, Van den Bosch T, Condous G. Abnormal uterine and post-menopausal bleeding in the acute gynaecology unit. *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2009 ;23(5):595-607.
6. Rossi A, Forzano L, Romanello I, Fachechi G, Marchesoni D. Assessment of endometrial volume and vascularization using transvaginal 3D power Doppler angiography in women with postmenopausal bleeding. *International Journal of Gynecology & Obstetrics*. 2012;119(1):14-7.
7. Epstein E, Valentin L. Managing women with post-menopausal bleeding. *Best practice & research Clinical Obstetrics & Gynaecology*. 2004;18(1):125-43.
8. Cavkaytar S, Kokanali MK, Ceran U, Topcu HO, Sirvan L, Doganay M. Roles of sonography and hysteroscopy in the detection of premalignant and malignant polyps in women presenting with postmenopausal bleeding and thickened endometrium. *Asian Pacific journal of Cancer Prevention*. 2013;15(13):5355-8.
9. Kadakola B, Gurushankar G, Shivamurthy G, Rashmi MN. Ultrasonographic evaluation of abnormal uterine bleeding in postmenopausal women. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2017 ;4(1):229-34.
10. Kaur M, Singh R, Sharma M. Endovaginal sonographic evaluation of postmenopausal uterine bleeding. *Journal of Clinical and Diagnostic Research*. 2010;4:2175-82.
11. Hunter DC, McClure N. Abnormal uterine bleeding: an evaluation endometrial biopsy, vaginal ultrasound and outpatient hysteroscopy. *The Ulster Medical Journal*. 2001;70(1):25.
12. Gull B, Carlsson SÅ, Karlsson B, Ylöstalo P, Milsom I, Granberg S. Transvaginal ultrasonography of the endometrium in women with postmenopausal bleeding: is it always necessary to perform an endometrial biopsy?. *American Journal of Obstetrics and Gynecology*. 2000;182(3):509-15.
13. Gull B, Karlsson B, Milsom I, Granberg S. Can ultrasound replace dilation and curettage? A longitudinal evaluation of postmenopausal bleeding and transvaginal sonographic measurement of the endometrium as predictors of endometrial cancer. *American Journal of Obstetrics and Gynecology*. 2003;188(2):401-8.
14. Kaur M, Singh R, Sharma M. Endovaginal sonographic evaluation of postmenopausal uterine bleeding. *J Clin Diagn Res*. 2010;(4):2175-82.
15. Granberg S. Sonography of the endometrium in the post-menopausal woman. *Ann Med*. 1994;26:81-3.
16. Karlsson B, Granberg S, Wikland M, Ylöstalo P, Torvid K, Marsal K, et al. Transvaginal ultrasonography of the endometrium in women with postmenopausal bleeding: a Nordic multicentre study. *Am J Obstet Gynaecol*. 1995;172:1488-94
17. Alcazar JL, Laparte C. Comparative study of transvaginal ultrasonography and hysteroscopy in postmenopausal bleeding. *Gynaecol Obstet Invest*. 1996;41(1):47-9.