

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20200368>

Original Research Article

## Evaluation of endometrium by transvaginal ultrasonography and hysteroscopy and its correlation with histopathology in perimenopausal women with abnormal uterine bleeding at tertiary rural centre

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**Received:** 03 December 2019

**Accepted:** 02 January 2020

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### ABSTRACT

**Background:** Abnormal uterine bleeding is one of the commonest clinical presentation accounts for 33% gynaecological consultations and this proportion rises to 70% in perimenopausal and postmenopausal age group in any gynaecology clinic. The most probable etiology of abnormal uterine bleeding relates to the patients reproductive age. Various diagnostic techniques have been evolved over the periods to determine the etiology of abnormal uterine bleeding in perimenopausal women, but their accuracy has not been compared properly. The aim of study is to evaluate the endometrium by transvaginal ultrasonography and hysteroscopy and its correlation with histopathology in perimenopausal patients with abnormal uterine bleeding.

**Methods:** Total 96 patients in perimenopausal age group, admitted with chief complaints of abnormal uterine bleeding were included. All patients underwent transvaginal ultrasonography and hysteroscopy, followed by hysteroscopy guided biopsy and histopathological examination. Accuracy, sensitivity, specificity, positive predictive value and negative predictive value were calculated for both methods and compared, considering histopathological diagnosis as gold standard.

**Results:** Mean age of patients was 44.05±3.29. Hysteroscopy has high accuracy, sensitivity, specificity, positive predictive value and negative predictive value than Transvaginal sonography for diagnosis of all endometrial and intrauterine pathologies.

**Conclusions:** Hysteroscopy results are more consistent with the results of histopathology. Hysteroscopy and hysteroscopy guided biopsy has been proven as gold standard for endometrial evaluation of patients with abnormal uterine bleeding. TVS can be used as most cost effective first step investigation in cases of perimenopausal bleeding.

**Keywords:** Abnormal uterine bleeding, Histopathology, Hysteroscopy, Transvaginal ultrasonography, perimenopausal women

### INTRODUCTION

Abnormal uterine bleeding is defined as bleeding from the uterine corpus that is abnormal in regularity, volume, frequency or duration and occurs in the absence of pregnancy.<sup>1</sup> Abnormal uterine bleeding is one of the

commonest clinical presentation accounts for 33% gynaecological consultations and this proportion rises to 70% in perimenopausal and postmenopausal age group.<sup>2</sup>

Abnormal uterine bleeding in perimenopausal age group is common but ill-defined entity. Peri-menopause is

defined as the period beginning with menopausal transition and ending 12 months after the last menstrual period.<sup>3</sup> The varied pattern of endometrial changes, symptomatic presentation and more incidence of abnormal uterine bleeding in perimenopausal women makes accurate and prompt diagnosis essential for appropriate management. This has attracted our attention in perimenopausal women and challenged us to undertake this study.

The International Federation of Gynaecology and Obstetrics (FIGO) in November 2010 developed a standardised classification system (PALM-COEIN) for causes of the abnormal uterine bleeding.<sup>4</sup>

PALM include structural causes and COEIN include non-structural causes of AUB.

To evaluate the endometrium as a cause of AUB in perimenopausal age group presently we have three modalities<sup>5</sup>:

- Imaging pattern of endometrium by transvaginal sonography (TVS)
- Visual assessment by hysteroscopy
- Cellular assessment by microscopic evaluation of endometrium samples.

Transvaginal sonography is an inexpensive, non-invasive, quick, painless, and a convenient way to indirectly visualize the intrauterine abnormalities in abnormal uterine bleeding women. In addition, it can also help to visualise the myometrium, endomyometrial junction, bilateral adnexa and ovaries. The endometrium should be measured in the long axis or sagittal plane.

We used 12 mm thickness of endometrium as the upper limit of normal in perimenopausal patients, beyond which it was called thickened endometrium. Thickened endometrium on transvaginal sonography is expected to correlate with endometrial hyperplasia on histopathology or hyperplastic/polypoidal endometrium on hysteroscopy. TVS is recommended as first line and minimal invasive diagnostic tool for assessing uterine pathology in abnormal uterine bleeding.<sup>6</sup> Hysteroscopy is the endoscopic evaluation of endometrial cavity via a telescope inserted through cervix. There are multiple and widespread applications for hysteroscopy, as it allows for direct visualisation and diagnosis of intrauterine abnormalities and it often offers an opportunity for simultaneous treatment.<sup>7</sup> It can be performed in an office setting (outpatient hysteroscopy) or as a day care procedure under anaesthesia (inpatient hysteroscopy). The endometrial biopsy involves taking a tissue sample of the endometrial lining of the uterus. The tissue subsequently undergoes a histological evaluation.

Hysteroscopically directed sampling detect a higher percentage of abnormalities. Even if the uterine cavity appears normal at hysteroscopy, the endometrium should

be sampled since hysteroscopy alone is not sufficient to exclude endometrial neoplasia and carcinoma.<sup>8</sup> In the present study, hysteroscopy guided biopsy is performed for cellular assessment of endometrial tissue.

The primed responsibility of a gynecologist is to rule out the presence of endometrial malignancy in cases of AUB, especially in women of perimenopausal and menopausal age group. The aim of our study is to evaluate the endometrium by transvaginal ultrasonography and hysteroscopy and its cor-relation with histopathology in perimenopausal patients with abnormal uterine bleeding.

## METHODS

This was a hospital based prospective comparative observational study conducted on 96 peri-menopausal female patients between 40 to 50 years with abnormal uterine bleeding admitted in department of obstetrics and gynaecology in collaboration with department of pathology at Uttar Pradesh University of Medical Sciences, Saifai, Etawah from January 2017 to June 2018.

Perimenopausal women of age 40-50 years but not achieved clinical menopause (not yet gone for 12 consecutive months of amenorrhea with abnormal uterine bleeding) were included in the study. Women of age group less than 40 years and more than 50 years, postmenopausal women, pregnancy and related causes of bleeding per vagina, women with intrauterine contraceptive device, women with coagulation disorders, women with known genital tract malignancy, women on hormonal therapy, women with cervicitis and vaginitis, women with recent uterine perforation, chronic medical illness including endocrine disorders, hemodynamically unstable patients, uterus size larger than 12 weeks gestation, women on medications like neuroleptics, anticoagulants and cytotoxic agents were excluded from the study. After obtaining written informed consent, each patient underwent a preliminary assessment by de-tailed history and clinical examination. All cases were subjected to transvaginal sonography, hysteroscopy and histopathology examination of endometrial sampling for evaluation of intrauterine pathology. Data were collected on a data collection sheet.

The patient was first evaluated with the transvaginal sonography. Transvaginal sonography was done using a 3-7 MHz endovaginal transducer. The uterus was evaluated in both the transverse and sagittal planes. Irregularities, thickness, echo pattern of endometrium and myometrium inter phase in the long axis and transverse plane were noted. Two-layer thickness of endometrium in anteroposterior dimension was taken in sagittal section view. Endometrial thickness of less than 12 was not-ed as normal endometrium and more than 12 mm was noted as thickened endometrium. Uterine pathology, adnexal and any other pelvic pathology was noted.

After transvaginal ultrasonography and pre-anesthetic checkup, patient was posted for hysteroscopy. Hysteroscopy was done with a rigid hysteroscope consisting of a telescope with a 3.7 mm outer diameter and a foroblique vision of 30°. Normal saline was used as distension media. Systematic examination of all four walls of the uterine cavity, fundus and the tubal openings was carried out.

The following observations were recorded on hysteroscopic examination: Panoramic view of uterine cavity for presence of endometrial polyp, leiomyoma, hyperplasia, carcinoma, any endometrial synechiae and foreign body, endometrium appearance, thickness and colour, tubal ostia and bilateral cornua, endocervical canal for any growth and polyp and Any other abnormalities. Hysteroscopic findings were noted on the patient's case sheet. The endometrial specimens were received using uterine curette just after hysteroscopy (hysteroscopy guided biopsy) from all the walls of uterus, including fundus or from suspicious wall in case of focal lesions. Specimen is collected in 10% formalin solution and sent for histopathological examination.

### Statistical analysis

For data analysis, qualitative variables were compared using Chi-Square test /Fisher's exact test as appropriate. To assess the validity between TVS and hysteroscopy, accuracy, sensitivity, specificity, PPV (positive predictive value) and NPV (negative predictive value) are used.

## RESULTS

As per the current study data on 96 cases as a sample, following observations and results were made out.

Out of 96 cases, 66.70% of women were in the age group of 40-45 years and 35.41% women in 45-50 years. Mean age of patients is 44.05±3.29 (Table 1).

**Table 1: Distribution of cases according to age.**

Age interval	Number of cases	Percentage
40-45 years	64	66.7%
45-50 years	32	33.3%
<b>Total</b>	<b>96</b>	<b>100.0%</b>
Mean±SD deviation		44.05±3.29

**Table 2: Distribution of cases according to socio-economic status.**

Socioeconomic status	Number of cases	Percentage
Upper	2	2.1%
Upper middle	24	25.0%
Lower middle	41	42.7%
Upper lower	20	20.8%
Lower	9	9.4%
<b>Total</b>	<b>96</b>	<b>100.0%</b>

The cases in our study consisted of 42.7% of patients from lower middle class and 30% cases below this class indicating predominance of lower socioeconomic status patients with abnormal uterine bleeding. Only 2.1% cases were from upper class (Table 2). On transvaginal sonography, normal endometrium (ET less than 12 mm) was found in 56.2% cases (Table 3). Most common abnormal finding was thickened endometrium (ET more than 12 mm) i.e. suspected hyperplasia.

**Table 3: Distribution of cases according to transvaginal sonography finding.**

TVS findings	Number of cases	Percentage
Normal endometrium (ET < 12 mm)	54	56.2%
Thickened endometrium (ET > 12 mm)	29	30.2%
Endometrial polyp	8	8.3%
Submucous myoma	5	5.2%
<b>Total</b>	<b>96</b>	<b>100%</b>

On hysteroscopy, normal endometrium were seen in 43.8% of cases- proliferative 28 (29.2%) and secretory 14 (14.6%) cases. Most common abnormal finding was hyperplastic endometrium (22.9%), followed by endometrial polyp (20.8%), submucous myoma (8.3%), endometritis (3.1%) and carcinoma endometrium (1.04%) (Table 4).

**Table 4: Distribution of cases according to hysteroscopy finding.**

Hysteroscopy finding	Number of cases	Percentage
Proliferative endometrium	28	29.2%
Secretory endometrium	14	14.6%
Endometrial polyp	20	20.8%
Submucous myoma	8	8.3%
Hyperplastic endometrium	22	22.9%
Endometritis	3	3.1%
Carcinoma endometrium	1	1.0%
<b>Total</b>	<b>96</b>	<b>100.0%</b>

**Table 5: Distribution of cases according to histopathology finding.**

Histopathological finding	Number of cases	Percentage
Proliferative endometrium	20	20.8%
Secretory endometrium	16	16.7%
Endometrial polyp	14	14.6%
Submucous myoma	8	8.3%
Hyperplastic endometrium	29	30.2%
Endometritis	8	8.3%
Carcinoma endometrium	1	1.04%
<b>Total</b>	<b>96</b>	<b>100.0%</b>

Out of 96 cases, the maximum number of cases had normal endometrium including proliferative (20.8%) and secretory (16.7%) and rest had abnormal endometrium, most common of which was hyperplastic endometrium

(30.2%). Others are endometrial polyp (14.6%), submucous myoma (8.3%), endometritis (8.3%) and carcinoma endometrium (1.04%) (Table 5).

**Table 6: Diagnostic characteristics of TVS for causes of AUB in perimenopausal women.**

	Accuracy	Sensitivity	Specificity	PPV	NPV
Normal endometrium	50.94%	51.16%	50.00%	81.48%	19.23%
Endometrial polyp	19.81%	9.30%	65.00%	53.33%	14.29%
Thickened endometrium	45.28%	33.72%	95.00%	96.67%	25.00%
Submucous myoma	21.69%	5.8%	90.00%	71.43%	18.18%

**Table 7: Diagnostic characteristics of hysteroscopy for causes of AUB in perimenopausal women.**

	Accuracy	Sensitivity	Specificity	PPV	NPV
Proliferative endometrium	85.41%	60.71%	95.59%	85.00%	85.53%
Secretory endometrium	95.83%	92.86%	96.34%	81.25%	98.75%
Endometrial polyp	91.67%	65.00%	83.33%	92.86%	41.67%
Submucous myoma	100.00%	100.00%	100.00%	100.00%	100.00%
Hyperplastic endometrium	86.46%	86.36%	86.49%	65.52%	95.52%
Endometritis	94.79%	100.00%	94.62%	37.50%	100.00%
Carcinoma endometrium	100.00%	100.00%	100.00%	100.00%	100.00%

Accuracy, sensitivity, specificity and negative predictive value of Transvaginal sonography for most of the endometrial condition is quiet poor, however positive predictive value is good except for endometrial polyp, suggesting it has less diagnostic efficacy for endometrial polyp (Table 6).

Hysteroscopy shows high accuracy, sensitivity, specificity, PPV and NPV for almost all the endometrial conditions (Table 7).

## DISCUSSION

Abnormal uterine bleeding in perimenopausal women have varied aetiologies ranging from physio-logical hormonal changes on one hand to endometrial neoplastic changes either benign or malignant, on the other hand. The mean age of patients in our study was  $44.05 \pm 3.29$  years. Lotha et al, Talukdar et al, Katke et al, and Pillai et al results were similar to this studies.<sup>9-12</sup> All the cases enrolled in our study are stratified according to modified Kuppuswamy scale. Since this hospital covers most of rural population, maximum number of cases are in lower middle class- 41 (42.7%).

On transvaginal sonography we observe 56.2% cases with normal endometrium (ET less than 12 mm), 30.2% cases of thickened endometrium (ET more than 12 mm) i.e. suspected hyperplasia, which was the commonest abnormal finding. In the present study we have taken ET more than 12 mm to suspect hyperplastic endometrium. Various other studies including Malpani et al, Pillai et al, have established correlation between endometrial

thickness and the presence of endometrial abnormalities in curettage material.<sup>12,13</sup>

Hysteroscopy provides direct visualization of intrauterine cavity, in fact, it is an eye in the uterus. On hysteroscopy, normal endometrium were seen 44.8% of cases of which 29.2% were proliferative and 14.6% were secretory. This was comparable to Singh et al and Patil et al who observed 48% and 50% cases with normal endometrium.<sup>14,15</sup> Most common abnormal finding was hyperplastic endometrium (22.9%), followed by endometrial polyp (20.8%), submucous myoma (8.3%), endometritis (3.1%) and carcinoma endometrium (1.04%).

On histopathology, the maximum number of cases had normal endometrium including proliferative (20.8%) and secretory (16.7%) and rest had abnormal endometrium, most common of which was hyperplastic endometrium (30.2%), others are endometrial polyp (14.6%), submucous myoma (8.3%), endometritis (8.3%) and carcinoma endometrium (1.04%).

Hysteroscopy shows high accuracy, sensitivity, specificity, PPV and NPV for almost all the endometrial conditions as compared to transvaginal sonography. Similar results were reported in studies of Katke et al, Jaiswar et al, Dasgupta S et al, and Bouzari Z et al.<sup>11,16-18</sup>

## CONCLUSION

Hysteroscopy and hysteroscopy guided biopsy has been proven as gold standard for endometrial evaluation of



patients with abnormal uterine bleeding in perimenopausal age group. Transvaginal sonography should be used as an complementary procedure to hysteroscopy in the work up of patients with abnormal uterine bleeding as it is an inexpensive, non-invasive, quick, painless and convenient procedure.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Singh P, Kumari K, Seth S, Verma V, Singh V. Evaluation of endometrium by transvaginal ultrasonography and hysteroscopy and its correlation with histopathology in perimenopausal women with abnormal uterine bleeding at tertiary rural centre. *Int J Reprod Contracept Obstet Gynecol* 2020;9:735-9.