

# Comparison of Transvaginal Ultrasonography with Hysteroscopy taking Endometrial Biopsy as Gold Standard in Perimenopausal Patients with Abnormal Uterine Bleeding

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## ABSTRACT

**Background:** Abnormal uterine bleeding (AUB) is an important cause of ill health in perimenopausal women. Accurate diagnosis of the causative factor of AUB in this age group is of utmost importance so that appropriate management can be established.

**Objectives:** The purpose of our study was to determine the diagnostic accuracy of transvaginal ultrasonography (TVS) and hysteroscopy (HYS) compared with histopathology in women with perimenopausal bleeding.

**Study design:** This is a nonrandomized, purposive sampling and prospective study.

**Setting:** This study was carried out in the Department of Obstetrics and Gynaecology of Dr Susheela Tiwari Memorial Hospital, Haldwani, Nainital district of Uttarakhand.

**Materials and methods:** We included those patients of perimenopausal age group who attended the gynecology department with the complaint of AUB during 18 months of our study period and in whom we were able to do all the three diagnostic modalities from January 2014 to July 2015.

**Results:** In the present study, mean age of patients was  $49.56 \pm 4.48$  years. Maximum patients (41.05%) were in age group of 41 to 45 years, while the least number (9.5%) of patients were in the age group 35 to 40 years. In our study,  $>5$  mm was the cutoff for postmenopausal patients, and  $>12$  mm was for perimenopausal patients. Accuracy rates of HYS for diagnosing all lesions were better than TVS. Both sensitivity and specificity were found to be more for HYS.

**Conclusion:** Our results showed that HYS is a powerful tool for evaluating the endometrial cavity for focal abnormalities, such as endometrial polyps or submucosal fibroids. Hysteroscopy with directed biopsy is the "gold standard" approach for the most accurate evaluation of the endometrium to rule out endometrial carcinoma.

**Clinical significance:** The TVS can be used as a routine first-step diagnostic technique, but HYS followed by histopathology should be considered as a gold standard for evaluation of abnormal vaginal bleeding.

**Keywords:** Abnormal uterine bleeding, Histopathology, Hysteroscopy, Transvaginal ultrasonography.

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## INTRODUCTION

Abnormal uterine bleeding (AUB) is an important cause of ill health in perimenopausal women and is defined as "any uterine bleeding outside the normal volume, duration, regularity or frequency" and accounts for two-thirds of hysterectomies.<sup>1,2</sup> Of the women attending gynecological outpatient department, those with AUB constitute 30 to 70%.<sup>3,4</sup> In postmenopausal women, any vaginal bleeding 6 months after cessation of menses is considered abnormal and requires evaluation.<sup>5,6</sup> Continuous bleeding, menorrhagia, or irregular heavy bleeding in the perimenopausal period are considered abnormal and should be investigated for malignancy of the genital tract, despite the common belief that they are signs of change. The etiology of such abnormalities may range from local anatomic causes to endocrine disorders, or even other organic diseases or iatrogenic factors.

Accurate diagnosis of the causative factor of AUB in this age group is of utmost importance so that appropriate management can be established. Tests have evolved over the years starting from blind dilatation and curettage (D&C), transvaginal sonography, to hysteroscopy-guided D&C. Relative accuracy of these tests varies and gynecologists all over the world up to now have not

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reached a consensus on what test to advise first. Due to its broad range of differential diagnosis, the diagnosis of AUB can be quite challenging; despite a detailed history, various blood tests and a thorough pelvic examination often involving transvaginal ultrasonography (TVS), D&C, or HYS, the cause of the bleeding is established in only 50 to 60% of the cases. The purpose of our study was to determine the diagnostic accuracy of TVS and HYS compared with histopathology in women with perimenopausal bleeding. This study emphasized on the evaluation of abnormal perimenopausal bleeding for early detection of endometrial hyperplasia, which is a precursor of endometrial carcinoma and other local anatomic causes, such as polyp and uterine submucosal myomas, which may require surgical treatment, by using TVS and HYS and comparing with histological findings, thus improving the quality of life and life expectancy of perimenopausal women.<sup>7</sup>

**MATERIALS AND METHODS**

**Study Place**

This study was carried out in the Department of Obstetrics and Gynecology of Dr Susheela Tiwari Memorial Hospital, Haldwani, Nainital district of Uttarakhand.

**Sampling Method and Study Design**

This is a nonrandomized, purposive sampling and prospective study.

**Sample Size and Study Period**

We included those patients of perimenopausal age group who attended the gynecology department with the complaint of AUB in 18 months of our study period and in whom we were able to do all the three diagnostic modalities from January 2014 to July 2015.

**Inclusion Criteria**

Patients belonging to the age group >35 years attending the gynecology department with AUB were included.

**Exclusion Criteria**

- Uterus >12 weeks size
- Hormone therapy within the last 6 months
- Previous abnormal endometrial biopsy
- Positive pregnancy test
- Cervical pathology on speculum examination
- Abnormal cervical Papanicolaou smear
- History/evidence suggestive of active pelvic infection.

**Data Analysis**

Data were statistically represented by range, mean, standard deviation (SD), and percentages. Accuracy was

represented using sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall accuracy. All statistical calculations were done using Microsoft Excel version 7 (Microsoft Corporation, NY, USA). The data were analyzed by Statistical Package for the Social Sciences version (SPSS) version 21. Analysis of the diagnostic accuracy of HYS and 2D-TVS specifically for intrauterine disorders, such as endometrial polyps and hyperplasia, 2 × 2 tables were constructed and accuracy rates were calculated.

**RESULTS**

In our study, mean age of patients was 49.56 ± 4.48 years. The maximum number of patients (41.05%) were in the age group of 41 to 45 years, while the least number (9.5%) of patients were in the age group 35 to 40 years (Table 1). In the present study, >5 mm was the cutoff for postmenopausal patients and >12 mm was for perimenopausal patients. Endometrial thickness (ET) should be taken as first-line investigation in perimenopausal patients with AUB. Out of 48 normal patients shown by histopathology, HYS showed 44 normal and 4 hyperplasia occurrences, while TVS showed 40 normal, 7 hyperplasia, 1 polyp, 1 adenomyosis, and 1 myoma. Out of 28 patients with hyperplasia as shown by histopathology, HYS showed 26 hyperplasia and 1 polyp, and TVS showed 25 hyperplasia and 1 normal. Out of three patients with myoma as shown by histopathology, both HYS and TVS correctly showed three patients with myoma. Polyp was also correctly diagnosed by both hysteroscopy and TVS (Table 2). Accuracy rates of HYS for diagnosing all lesions were better than those for TVS. Both sensitivity and specificity were found to be more for HYS. The positive likelihood ratio (LHR+) for HYS (8.16) was more than the LHR+ for TVS (3.98) (Table 3).

**DISCUSSION**

The aim of the study is to determine whether TVS or HYS is better in determining the cause of AUB in perimenopausal females taking histopathology as gold standard. In our study, the mean age of patients was 49.56 ± 4.48 years, and 47.3% of the patients were of 1 to 3 parity followed by 43.2% of 4 to 5 parity and 2.1% of nulliparous status. Hence, it can be concluded that AUB may be associated with increasing parity.

**Table 1:** Distribution of patients according to age

Sl. no.	Age group (years)	No. of patients	Percentage
1	35–40	9	9.5
2	41–45	39	41.05
3	46–50	26	27.36
4	>51	21	22.10
	Total	95	100



**Table 2:** Transvaginal ultrasonography vs hysteroscopy vs histopathology

Histopathology	Total	Hysteroscopy	TVS
Hyperplasia	28 (29.47)	Hyperplasia = 26 Polyp = 2	Hyperplasia = 25 Polyp = 2 Myoma = 1
Adenomyosis	4 (4.21)	Normal = 4	Adenomyosis = 4
Polyp	5 (5.26)	Polyp = 5	Polyp = 5
Submucous myoma	3 (3.15)	Myoma = 3	Myoma = 3
Atrophic	3 (3.15)	Normal = 1 Atrophic = 2	Normal = 3
Endometritis	2 (2.1)	Normal = 2	Normal = 2
Carcinoma	1 (1.1)	Carcinoma = 1	Hyperplasia = 1
Insufficient sample	1 (1.1)	Normal = 1	Normal = 1
Normal	48 (50.52)	Hyperplasia = 4 Normal = 44	Hyperplasia = 7 Adenomyosis = 1 Polyp = 1 Myoma = 1 Normal = 40

**Table 3:** Accuracy rates of TVS and hysteroscopy for diagnosing all lesions

Measure	Diagnosis	
	TVS (%)	Hysteroscopy (%)
Sensitivity	82.98	85.11
Specificity	79.17	89.58
PPV	79.59	88.89
NPV	82.60	86
LHR+	3.98	8.16
LHR-	0.21	0.16

The commonest lesion diagnosed by histopathology and TVS is endometrial hyperplasia, which was found in 29.47% of the examined specimens and 32.63% of ultrasonic findings. The TVS was not able to diagnose patients with endometrial cancer. Taking a >5 mm ET as a cutoff level for detection of endometrial pathology in postmenopausal women and 12 mm in perimenopausal women were of good practical application in our study, with an overall accuracy of >80%. This agrees with Mowafi et al,<sup>8</sup> Grandberg et al,<sup>9</sup> Cacciatore et al,<sup>10</sup> and Nasri et al.<sup>11</sup> This shows that TVS can reach a higher sensitivity once ET is taken into account. The TVS showed good correlation with the hysteroscopic findings for normal variants of endometrium, but poor correlation for intracavitary pathology, as the majority of the ET in cases of abnormal hysteroscopic findings were also in the normal ET range (6–10 mm).

Both HYS and TVS were good in diagnosing endometrial hyperplasia and myoma, but adenomyosis was not diagnosed on HYS, while atrophic endometrium was not seen in TVS. Endometritis was not diagnosed by any of the two modalities. Hysteroscopy was good in diagnosing polyp, while TVS was good in diagnosing adenomyosis. The most worrisome cause of AUB, in the minds of both

patients and clinicians, is endometrial carcinoma, especially at menopausal age. In the present study, only one case of endometrial carcinoma was detected and it was misdiagnosed as endometrial hyperplasia on TVS, while HYS correctly diagnosed it. For diagnosing all lesions of endometrial cavity, both sensitivity and specificity of HYS – (85.11%), (89.58%) – were found to be more than the sensitivity and specificity of TVS – (82.98%), (79.17%) respectively. The PPV and NPV of HYS were found to be more than that for TVS, which was also seen in the study by Ryu et al<sup>12</sup> and Farquhar et al.<sup>13</sup> For TVS, LHR+ was 3.98 while LHR– was 0.21. For HYS, LHR+ was 8.16 and LHR– was 0.16. As positive LHR of HYS is more than positive LHR of TVS and negative LHR of HYS is less than negative LHR of TVS, we can conclude that HYS is a better diagnostic test than TVS for uterine pathology. Gunjan and Sharnml<sup>14</sup> also found sensitivity of 86.4% and an LHR+ of 2.81 by TVS, while HYS had a much higher sensitivity and LHR+ of 90.6% and 7.5% respectively.

**CONCLUSION**

In conclusion, our results showed that HYS is a powerful tool for evaluating the endometrial cavity for focal abnormalities, such as endometrial polyps or submucosal fibroids. Hysteroscopy with directed biopsy is the “gold standard” approach for most accurate evaluation of the endometrium to rule out endometrial carcinoma. A single-stop approach, especially in high-risk women (obesity, diabetes, and family history of endometrial, ovarian, or breast cancers) as well as in women with endometrial hyperplasia and in patients with heavy bleeding, of combining the HYS and directed biopsy in the presence of a focal lesion, and sampling of the endometrium, all without anesthesia is the most minimally invasive and yet accurate approach in current practice. Besides being a diagnostic method, HYS is also curative; the majority of patients get treated simultaneously by HYS-guided curettage.

**CLINICAL SIGNIFICANCE**

Transvaginal ultrasonography can be used as a routine first-step diagnostic technique, but HYS followed by histopathology should be considered as a gold standard for evaluation of abnormal vaginal bleeding.

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