Section: Obstetrics and Gynaecology

Original Research Article

A STUDY ON ROLE OF HYSTEROSCOPY & TRANSVAGINAL ULTRASOUND IN THE EVALUATION OF ABNORMAL UTERINE BLEEDING AND TO COMPARE THE EFFICACY OF HYSTEROSCOPY VS TRANSVAGINAL ULTRASOUND AS A DIAGNOSTIC PROCEDURE

Niranjana Ravichandra[1], Lairenjam Dipenty Devi[2], Wangol Kiyam[3]

[1]Consultant Obstetrics & Gynaecology, Nirmala Hospital, Tamil Nadu, India.
[2]Assistant Professor, Department of Obstetrics & Gynaecology, Shija Academy of Health, Sciences, Imphal, India.
[3]Associate Professor, Department of Pathology, Shija Academy of Health Sciences, Imphal, India.

Received : 10/04/2026
Received in revised form : 21/05/2026
Accepted : 07/06/2026

Keywords:
Abnormal uterine bleeding; hysteroscopy; transvaginal sonography; endometrial pathology.

Corresponding Author:
Dr. Wangol Kiyam
Email: wangolkiyam54@gmail.com

DOI: 10.47009/jamp.2026.8.3.176

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (3); 979-984

ABSTRACT

Background: The aim is to assess the utility of hysteroscopy as a diagnostic tool in AUB and to evaluate the efficacy of transvaginal sonography (TVS) by correlating both with histopathological findings. **Materials and Methods:** This prospective study was conducted in the Department of Obstetrics and Gynaecology, Meenakshi Medical College Hospital and Research Institute, Kanchipuram, from January 2015 to July 2016. One hundred women aged 25–50 years with clinically diagnosed AUB were randomly selected from the outpatient department. All patients underwent TVS and diagnostic hysteroscopy under intravenous anaesthesia, followed by dilatation and curettage and removal of abnormal lesions such as polyps and submucous fibroids. The specimens were subjected to histopathological examination, which served as the reference standard. **Result:** Menorrhagia was the most common bleeding pattern. Hysteroscopy was found to be a safe and acceptable procedure, allowing direct visualization of intracavitary abnormalities and visually directed biopsy. Compared with TVS, hysteroscopy showed higher diagnostic accuracy for identifying endometrial and intracavitary lesions. **Conclusion:** Hysteroscopy is a safe, feasible, and efficient investigative tool for evaluating endometrial pathology in women with AUB and is superior to TVS in detecting intracavitary abnormalities. Its use can help in selecting appropriate, and often conservative, management and may reduce the need for major surgery.

INTRODUCTION

Abnormal uterine bleeding (AUB) is defined as any type of uterine bleeding that shows variation in cyclicity, duration, frequency, or amount of bleeding compared with normal menstruation. AUB accounts for more than one-third of gynecologic consultations and nearly two-thirds of hysterectomies.[1,2] In addition to its inconvenience, AUB is regarded as a sign of possible uterine disease, and recent reports demonstrate distinct prognostic and management implications for benign, premalignant, and malignant causes.

A thorough history and physical examination are fundamental in the work-up of AUB. Benign uterine diseases and endometrial hyperplasia are responsible for at least 70% of AUB cases; therefore, investigation of the uterine cavity is crucial to enable the gynecologist to offer the most appropriate therapy. AUB in premenopausal and postmenopausal women is the single most common reason for gynecological referral.[1,2] Although histopathological examination of the uterus after hysterectomy is considered the ultimate gold standard in evaluation of the uterine cavity, it cannot be used as a primary diagnostic tool.

In premenopausal women, the most common pathologies associated with AUB are submucous fibroids, endometrial polyps, and endometrial hyperplasia. Accurate diagnosis of these conditions facilitates medical or conservative surgical treatment of the specific lesion and may avoid the need for major surgery.

The most commonly used modalities for evaluating AUB are hysteroscopy, dilatation and curettage (D&C), and ultrasonography. Hysteroscopy permits direct visualization of the cervical canal and uterine cavity, enabling identification of intrauterine

abnormalities. Over the past three decades, advances in instrumentation, optics, and light sources have resulted in significant developments in diagnostic and operative endoscopy in gynecology.[3-5]

Diagnostic hysteroscopy, first described by Edström and Fernström in 1970, has been shown to be superior to conventional D&C in the evaluation of AUB.[6,7] Panoramic hysteroscopy allows complete visual inspection of the uterine cavity, endometrium, and endocervical canal, while targeted biopsy allows histological confirmation of the diagnosis. Technological advances have enabled manufacturers to reduce the diameter of hysteroscopic instruments, making diagnostic hysteroscopy without anaesthesia a true outpatient ambulatory procedure.

Hysteroscopy combined with guided biopsy is more accurate than D&C and is considered the gold standard in uterine cavity evaluation.[8,9] It has emerged as a useful diagnostic procedure that is safe, with a low incidence of clinically significant complications. In the presence of organic lesions, hysteroscopy allows visualization of the probable uterine source of bleeding and improves the chance that tissue obtained by directed biopsy will yield an accurate histologic diagnosis.

Transvaginal ultrasonography is a widely available, relatively cost-effective, and practical method for evaluating uterine pathologies. It is non-invasive and causes minimal discomfort to the patient and is therefore commonly used as the initial modality in patients with AUB or non-bleeding symptomatic patients. Its simplicity and availability make it a helpful screening tool; however, its modest diagnostic value for many uterine pathologies renders interpretation of findings challenging.

Therefore, the purpose of this study was to evaluate the diagnostic accuracy of hysteroscopy, correlate it with transvaginal ultrasound findings in women with symptoms of AUB using histopathological examination of the endometrium as the gold standard, and to emphasize the increasing use of outpatient hysteroscopy as an effective and acceptable method in the management of women with bleeding problems.

Aim of the Study

- To demonstrate the utility of hysteroscopy as a diagnostic tool in the evaluation of abnormal uterine bleeding.
- To evaluate the efficacy of transvaginal sonography in diagnosing pathological conditions in AUB and to correlate hysteroscopic and TVS findings with histopathological findings.

MATERIALS AND METHODS

Study design and setting

This was a prospective observational study conducted in the Department of Obstetrics and Gynaecology at Meenakshi Medical College Hospital and Research Institute, Kanchipuram. The study was carried out over a period of eighteen months, from January 2015 to July 2016. A total of 100 patients aged between 25 and 50 years were randomly selected from the gynaecology outpatient department and enrolled as study participants. The study was approved by the Institutional Ethics Committee and written informed consent was obtained from all participants prior to enrolment

Study population and sample size

Patients with a clinical diagnosis of AUB were selected at random from the gynecology outpatient department. The age of the selected patients ranged from 25 to 50 years. A total of 100 patients were included.

Inclusion criteria

Women aged 25–50 years presenting with abnormal uterine bleeding.

Exclusion criteria

- Positive pregnancy test
- Recent cervicitis, vaginitis, or endometritis
- Pelvic infection
- Significant cardiopulmonary illness

Clinical evaluation and baseline investigations

A detailed history was obtained as per a structured proforma. General physical, systemic, per abdominal, per speculum, and bimanual pelvic examinations were performed. Baseline investigations included: Hemoglobin, urine examination (albumin, sugar, deposits) electrocardiography

Informed consent for the procedure and anaesthetic assessment for hysteroscopy and D&C were obtained. Patients were advised a light dinner before 10 PM on the night prior to hysteroscopy, and routine pre-operative preparation was done.

Transvaginal (endovaginal) sonography

On the day of the procedure, endovaginal ultrasonography was performed before hysteroscopy using an endovaginal transducer with an acoustic frequency of 5 MHz. The patient was placed in the dorsal or lithotomy position. A condom or glove was applied over the probe with coupling gel to ensure optimal contact. The uterus and cervix were evaluated in sagittal (long-axis), semi-coronal, and semi-axial planes.

Hysteroscopy was performed under intravenous ketamine anaesthesia. The instrument used consisted of a rigid 2 mm telescope (Hopkins rod lens) with a 5 mm sheath and fibre-optic illumination. Ringer lactate solution was used as the distension medium.

After reassessment by the anaesthetist, the patient was placed in lithotomy position. Following catheterization of the bladder and bimanual examination, a Sim's speculum was introduced and the anterior lip of the cervix grasped with vulsellum. The length of the uterine cavity was measured and the internal os dilated up to a 7 Hegar dilator in most patients.

The hysteroscope was introduced into the cervical canal under direct vision. The distension pressure was maintained between 80–100 mmHg. The uterine cavity was systematically examined, noting:

ISSN (O): 2687-5365; ISSN (P): 2753-6556

endometrial surface and colour, vascularity, glandular pores, and tubal ostia. Blood clots were washed out using the distension medium. The duration of the procedure and total volume of distension fluid used were recorded. Any focal lesions (polyps, submucous fibroids) were biopsied or removed. In the absence of focal pathology, endometrial curettings were obtained using a sharp curette. In premenopausal women, curettings were taken from the endocervix, isthmus, and uterine cavity.

Histopathological examination

All curetted material and excised lesions (polyps, fibroids, hysterectomy specimens in 10 patients) were sent for histopathological examination (HPE), which served as the gold standard. Endometrium was categorized as proliferative, secretory, simple hyperplasia, complex hyperplasia, atrophic, polyp, or carcinoma. For analysis, proliferative and secretory endometrium were considered normal; hyperplasia, endocervical polyp, submucous fibroid, atrophic endometrium, and carcinoma were considered abnormal pathology.

Statistical analysis

Demographic details and clinical findings were analysed as numbers and percentages. Sensitivity, specificity, PPV, NPV, and accuracy of TVS and hysteroscopy for detecting abnormal pathology were calculated using 2×2 tables, taking HPE as the gold standard. The chi-square test was used to compare proportions. A p-value <0.05 was considered statistically significant. Statistical analysis was performed using SPSS software version 21.

RESULTS

The age distribution of patients with AUB showed that the majority were 35 years and above. Only 3% were in the 25–29 year group, 8% in 30–34 years, 32% in 35–39 years, 27% in 40–44 years, and 30% in 45–49 years.

Most patients were of high parity, with 37% being para 4 or above; 3% were nulliparous, 4% para 1, and 28% each para 2 and para 3. [Figure 1]

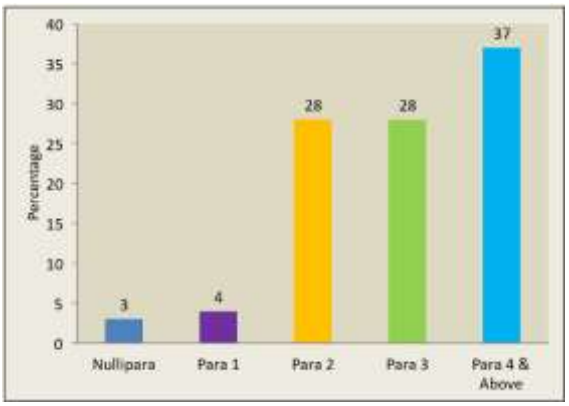

Figure 1: shows the Parity distribution of patients presented with AUB

The most common presenting complaint was menorrhagia (28%), followed by metropathia haemorrhagica (25%), metrorrhagia (17%), polymenorrhagia (15%), and polymenorrhoea (15%). [Table 1]. The duration of complaints was 6–9 months in 33% of patients, 1–2 years in 26%, less than 3 months in 15%, 3–5 months in 14%, and more than 2 years in 12%.

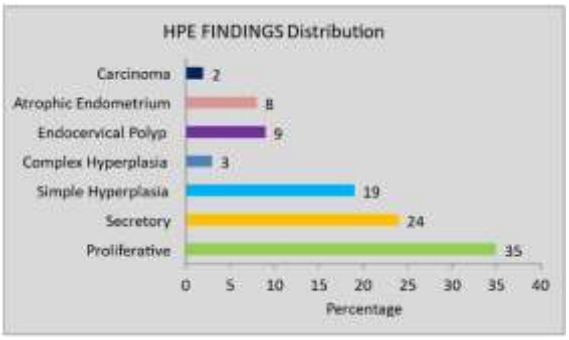

Figure 2: Shows the Histopathology findings in patients presented with AUB

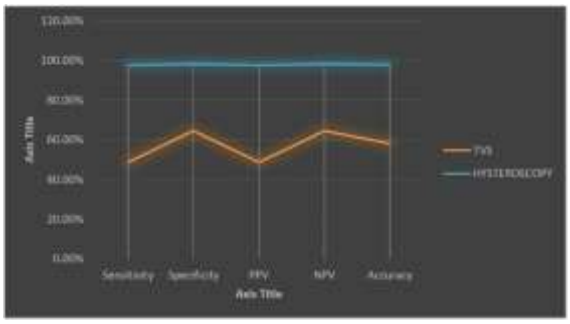

Figure 3: Statistical significance

Structural pathology was identified in 8% (endocervical polyp 4%, submucous fibroid 4%). Overall, TVS reported hyperplasia in 12% and normal endometrium (proliferative or secretory) in 80% of patients. Abnormal pathology (hyperplasia, polyp, fibroid) was detected in 20%. [Table 2]

Among 100 patients on hysteroscopy, proliferative and secretory endometrium were seen in 35% and 25% of patients respectively, giving a total of 60% with normal endometrium. Hyperplastic endometrium (simple 16%, complex 5%) was observed in 21% of patients, endocervical polyps in 9%, and submucous fibroids in 10%. Thus, hysteroscopy detected abnormal pathology in 40% of women with AUB, with hyperplasia accounting for approximately half of all abnormal findings. [Table 3]

Overall, normal endometrium (proliferative or secretory) was present in 59%, and abnormal pathology (hyperplasia, polyp, atrophy, carcinoma) in 41%. Ten patients who underwent hysterectomy had submucous fibroid, correlating with hysteroscopy findings. [Table 4]

Among 100 patients on histopathological examination the endometrium was reported as proliferative in 35 % patients, secretory in 24 %

ISSN (O): 2687-5365; ISSN (P): 2753-6556

patients, simple hyperplasia in 19 % patients, complex hyperplasia in 3% patients, endocervical polyp in 9 % patients, atrophic endometrium in 8 % patients, carcinoma in 2 % patients. Among 100 patients 10 % patients who underwent hysterectomy had submucous fibroid which is correlating with hysteroscopy findings. [Figure 2]

In the 100 patients studied, normal endometrium was identified in 80% by transvaginal sonography (TVS), 60% by hysteroscopy, and 59% by histopathological examination, taken as the gold standard. Endometrial hyperplasia was detected in 12% of patients by TVS, 21% by hysteroscopy, and 22% by histopathology. Endocervical polyps and submucous fibroids were identified in 8% of patients by TVS, 19% by hysteroscopy, and 18% by histopathology. Overall, abnormal pathology was detected in 20% of patients by TVS, 41% by hysteroscopy, and 42% by histopathology. Carcinoma endometrium was reported in 2% of patients on histopathological examination. Among the 10 patients who underwent hysterectomy, all were diagnosed with fibroid uterus, correlating with the hysteroscopic findings. [Table 5]

Diagnostic performance of hysteroscopy

Number of abnormal pathology diagnosed by histopathology (Gold standard)= 42, 41 cases were diagnosed to have abnormal findings by hysteroscopy among 100 cases which includes hyperplastic endometrium in 21 % patients (simple-16%, complex-5%), polyp in 9% patients, & submucous fibroid in 10% patients

Diagnostic performance of TVS

When compared with the gold standard, TVS detected 20 true positive cases and 38 true negative cases. However, it missed 21 cases of actual disease, giving false negative results, and falsely labeled 21 disease-free cases as positive, giving false positive results

Using the chi-square test, abnormal pathology detected by hysteroscopy (40 of 41) and TVS (20 of 41) was compared against HPE as gold standard. The p-value was 0.000001, which is highly significant ($p < 0.05$), indicating that hysteroscopy is significantly superior to TVS in diagnosing endometrial pathology in AUB.

Table 1: Shows bleeding pattern in patients presented with AUB

Complaints	Number of patients	Percentage
Menorrhagia	28	28
Metorrhagia	17	17
Metropathia haemorrhagica	25	25
Polymenorrhagia	15	15
Polymenorrhea	15	15
Total	100	100.0

Table 2: Shows the normal and pathological findings in Transvaginal Sonography (TVS)

Endometrial Thickness	Type of Endometrium	Number of Patients	Percentage
5-10 mm	Proliferative	50	50.0
11-14mm	Secretory	30	30.0
>14mm	Hyperplastic	12	12.0
-	Endocervical Polyp	4	4.0
-	Submucous Fibroid	4	4.0
Total		100	100.0

Table 3: Shows the hysteroscopy findings in patients presented with AUB

Findings in hysteroscopy	Number of Patients	Percentage
Proliferative	35	35.0
Secretory	25	25.0
Simple	16	16.0
Complex hyperplasia	5	5.0
Endocervical Polyp	9	9.0
Submucous Fibroid	10	10.0
Total	100	100.0

Table 4: Shows HPE findings in patients presented with AUB

Finding of Number endometrium Patients		of Percentage
Proliferative	35	35.0
Secretory	24	24.0
Simple Hyperplasia	19	19.0
Complex Hyperplasia	3	3.0
Endocervical Polyp	9	9.0
Atrophic Endometrium	8	8.0
Carcinoma	2	2.0
Total	100	100.0

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 5: Comparison of Transvaginal Ultrasound, Hysteroscopy Findings and Histopathology Report

Type of Endometrium	Findings in Hysteroscopy	Findings in Transvaginal Ultrasound (TVS)	Finding in Histopathology
Proliferative	35	50	35
Secretory	25	30	24
Simple Hyperplasia	16	12	19
Complex Hyperplasia	5		3
Endocervical Polyp	9	4	9
Submucous Fibroid	10	4	0
Atrophic	-	0	8
Carcinoma	-	-	2
Total	100	100	100

Table 6: Sensitivity And Specificity Of Hysteroscopy

Sensitivity	97.56%
Specificity	98.30%
Positive predictive value	97.56%
Negativepredictive value	98.30%
Concordance(Accuracy)	98.0%

Table 7: Sensitivity And Specificity of TVS

	Disease actually		
TVS	**Present**	**Absent**	**Total**
Present	20	21	41
Absent	21	38	59
Total	41	59	100

DISCUSSION

This prospective study of 100 women aged 25–50 years with AUB compared hysteroscopy and TVS against histopathology for detection of endometrial pathology. The maximum incidence of AUB was observed in women aged 35 years and above and in those with higher parity (para 4 and above), consistent with the known epidemiology of AUB in perimenopausal women. Menorrhagia was the most common bleeding pattern, followed by metropathia haemorrhagica, similar to previous reports.

The present study confirms that hysteroscopy with endometrial biopsy is an excellent diagnostic tool in AUB and supports earlier evidence that it is the gold standard investigation for intrauterine pathology.[7,9] Large reviews and meta-analyses have shown that blind D&C has lower sensitivity and a higher complication rate for focal lesions such as polyps and pedunculated intracavitary myomas, making it an inadequate standalone diagnostic procedure.[10,15] Hysteroscopy, by offering direct visualization and targeted biopsy, overcomes these limitations.[8,9]

In this study, hysteroscopy demonstrated very high sensitivity (97.56%), specificity (98.30%), and accuracy (98%) for detecting abnormal pathology when compared with histopathology. TVS, although useful as an initial, non-invasive screening tool, showed modest sensitivity (48.78%) and specificity (64.4%), and relatively low accuracy (58%).[13,14] TVS missed a substantial number of cases detected by hysteroscopy and HPE, particularly subtle hyperplasias and focal lesions.

These observations are in line with previous studies which have reported higher diagnostic accuracy of hysteroscopy compared with TVS for endometrial hyperplasia, polyps, and submucous fibroids. [6,10] Studies from tertiary centres and outpatient hysteroscopy clinics have likewise concluded that hysteroscopy with guided biopsy offers the highest sensitivity and PPV for endometrial hyperplasia and other intrauterine lesions.[9,7]

Although hysteroscopy traditionally required anaesthesia and hospital stay, advances in instrument miniaturization have enabled office hysteroscopy with small-diameter (<4 mm) scopes without dilatation in many cases, reducing procedure time and patient discomfort.[5,11] In this study, even when performed under intravenous ketamine anaesthesia, no major complications were observed, further supporting the safety of the procedure.

Overall, the data indicate that while TVS remains a valuable first-line, non-invasive, and accessible screening modality, hysteroscopy should be considered whenever TVS is abnormal or equivocal, or when symptoms persist despite normal TVS findings.[13,14]

CONCLUSION

In this prospective study of 100 women with abnormal uterine bleeding, hysteroscopy proved to be a safe, useful, and highly accurate method for assessing endometrial functional status and identifying intracavitary pathology. Acceptance of the procedure was high, and no major complications occurred. Hysteroscopy was clearly superior to transvaginal ultrasound in detecting endometrial hyperplasia, polyps, and submucous fibroids and has the additional advantage of allowing visually directed biopsy.

With advances in technology and the availability of small-diameter hysteroscopes, hysteroscopy can be

ISSN (O): 2687-5365; ISSN (P): 2753-6556

performed as an office procedure without cervical dilatation in many cases, thereby reducing procedure time and patient discomfort. Routine use of hysteroscopy with endometrial biopsy in the evaluation of AUB can identify otherwise unsuspected intrauterine pathology, improve diagnostic yield, and assist both the gynecologist and pathologist in obtaining adequate and representative endometrial tissue. Hence, hysteroscopy forms an efficient and reliable investigative tool in diagnosing endometrial pathology in cases of abnormal uterine bleeding.

REFERENCES

1. Munro MG, Critchley HOD, Broder MS, Fraser IS; FIGO Working Group on Menstrual Disorders. FIGO classification system (PALM-COEIN) for causes of abnormal uterine bleeding in nongravid women of reproductive age. Int J Gynaecol Obstet. 2011;113(1):3–13.
2. Phatate SB, Pawar AG. Diagnostic evaluation of hysteroscopy and transvaginal sonography in abnormal uterine bleeding in perimenopausal women and its histopathological correlation. Int J Sci Res. 2023;12(12):5405525.
3. Vitale SG, Sapia F, Rapisarda AMC, Valenti G, Santangelo F, Rossetti D, et al. Hysteroscopic management of intrauterine pathologies in postmenopause. Climacteric. 2021;24(1):51–9.
4. van den Bosch T, Ameye L, Van Schoubroeck D, Bourne T, Timmerman D. Intra-cavitary uterine pathology in women with abnormal uterine bleeding: a prospective study of 1220 women. Facts Views Vis ObGyn. 2015;7(1):17–24.
5. Drizi A, Giannini A, van Herendael BJ, Riemma G, Carugno J, Mereu L, et al. Hysteroscopy: where did we start, and where are we now? Arch Gynecol Obstet. 2024;310(4):2105–26.
6. Edström K, Fernström I. The diagnostic possibilities of a modified hysteroscopic technique. Acta Obstet Gynecol Scand. 1970;49(4):327–30.
7. Hunter DC, McClure N. Abnormal uterine bleeding: an evaluation of endometrial biopsy, vaginal ultrasound and outpatient hysteroscopy. Ulster Med J. 2001;70(1):25–30.
8. Di Spiezio Sardo A, Saccone G, Carugno J, Pacheco L, Zizolfi B, Haimovich S, et al. Endometrial biopsy under direct hysteroscopic visualisation versus blind endometrial sampling for the diagnosis of endometrial hyperplasia and cancer: systematic review and meta-analysis. Facts Views Vis ObGyn. 2022;14(2):107–16.
9. Clark TJ, Voit D, Gupta JK, Hyde C, Song F, Khan KS. Accuracy of hysteroscopy in the diagnosis of endometrial cancer and hyperplasia: a systematic quantitative review. JAMA. 2002;288(13):1610–21.
10. Gkrozou F, Dimakopoulos G, Vrekoussis T, Lavasidis L, Koutlas A, Navrozoglou I, et al. Hysteroscopy in women with abnormal uterine bleeding: a meta-analysis on four major endometrial pathologies. Arch Gynecol Obstet. 2015;291(6):1353–60.
11. Kwiatkowski A, Doniec J, Sobociński K, Szafarowska M, Biela M, Kamiński P. Is every patient eligible to have an office hysteroscopy? A retrospective analysis of 1301 procedures. Wideochir Inne Tech Maloinwazyjne. 2019;14(4):571–7.
12. Jansen FW, Vredevoogd CB, van Ulzen K, Hermans J, Trimbos JB, Trimbos-Kemper TCM. Complications of hysteroscopy: a prospective, multicenter study. Obstet Gynecol. 2000;96(2):266–70.
13. Mathew M, Gupta R, Krölikowski A. Role of transvaginal ultrasonography and diagnostic hysteroscopy in the evaluation of patients with abnormal uterine bleeding. Int J Gynaecol Obstet. 2000;71(3):251–3.
14. Wanderley MS, Álvares M, Vogt MF, Sazaki LMP. Accuracy of transvaginal ultrasonography, hysteroscopy and uterine curettage in evaluating endometrial pathologies. Rev Bras Ginecol Obstet. 2016;38(10):506–11.
15. Ergenoğlu AM, Hortu I, Taylan E, Yeniel AO, Akdemir A, Sahin C, et al. Can we rely on blind endometrial curettage for complete removal of focal intrauterine lesion? A prospective clinical study. J Gynecol Obstet Hum Reprod. 2020;49(5):101696.

ISSN (O): 2687-5365; ISSN (P): 2753-6556