

# The place of transvaginal ultrasonography saline infusion sonohysterography and hysteroscopy in the diagnosis of abnormal uterin bleedings

Şifa Ayşe Savaş Özolcay<sup>1</sup>, Ozan Özolcay<sup>2</sup>, Bulat Aytek Şık<sup>3</sup>

<sup>1</sup>Istanbul Bakırköy Dr. Sadi Konuk Education and Research Hospital, Department of Gynecology and Obstetrics, İstanbul, Turkey

<sup>2</sup>Istanbul IVF Centre, Department of Gynecology and Obstetrics, İstanbul, Turkey

<sup>3</sup>Istanbul Aydın University, School of Medicine, Department of Gynecology and Obstetrics, İstanbul, Turkey

**Cite this article as:** Savaş Özolcay ŞA, Özolcay O, Şık BA. The place of transvaginal ultrasonography saline infusion sonohysterography and hysteroscopy in the diagnosis of abnormal uterin bleedings. J Health Sci Med 2021; 4(2): 154-159.

## ABSTRACT

**Aim:** To establish the accuracy of transvaginal ultrasonography, saline infusion sonohysterography and hysteroscopy in diagnosing uterine pathology in patients with abnormal uterine bleeding.

**Material and Method:** In our study, Transvaginal ultrasonography (TVUSG), saline infusion sonohysterography (SIS) and hysteroscopy were applied to 60 patients in the reproductive period, who did not use any contraception method other than condom, who did not have chronic and systemic diseases, who applied to our clinic with abnormal uterine bleeding. Dilatation & Curettage (D&C) was applied to all patients after the procedure. Histopathology results obtained with D&C were compared with those obtained with TVUSG, SIS and hysteroscopy.

**Results:** Histopathologically, 28 patients (46.7%) endometrial polyp, 4 patients (6.7%) submucous myoma, 10 patients (16.7%) endometrial hyperplasia was in the form of endometrial changes due to cycle irregularities in 18 patients (30%). The sensitivity, specificity, positive and negative predictive values for detection of intracavitary pathology by transvaginal sonography were 71.42%, 77.78%, 88.23%, 83.85%. The values determined by saline infusion sonohysterography were respectively 88.89%, 90.48%, 80.00%, 95.0% and by hysteroscopy were respectively 100%, 90.00%, 95.24%, 100%.

**Conclusion:** TVUSG and SIS is a cheaper, easier and highly diagnostic value procedure for detecting endometrial pathologies such as endometrial polyps and submucous myomas. However, due to the high diagnostic values, low complication rates, direct biopsy and simultaneous treatment, we believe that hysteroscopy will maintain its 'gold standard' feature in the diagnosis and treatment of endometrial pathologies for many years.

**Keywords:** Abnormal uterine bleeding, hysteroscopy, endometrial polyp, saline infusion sonohystography

## INTRODUCTION

Most women experience menstrual cycle irregularities at some part of their lives. Abnormal uterine bleeding (AUB), which is one of those kind irregularities, is up to one third of reason for admission to gynecology outpatient clinic throughout life and postmenopausal period. The main causes of abnormal uterine bleeding are classified as; polyp, adenomyosis, leiomyoma, malignancy and hyperplasia, coagulopathy, ovulatory dysfunction, endometrial causes,iatrogenic and those not yet classified (1). The diagnosis of space-occupying lesions in the endometrial cavity with transvaginal ultrasonography (USG) and saline infusion hydrosography (SIS) has been used

safely for many years. However, endometrial sampling is an important diagnostic method in the diagnosis of endometrial pathologies (2). Dilatation/curettage (D&C) procedure, was first applied by Recaimer in 1843, has been used in the detection of endometrial pathologies and accepted as a gold standard (3). First the cervix is dilated, then all parts of the endometrium from fundus to internal os are curetted, it is an invasive method with a high risk of complication (4). Hysteroscopy (H/S) can be performed in an outpatient examination environment because of hysteroscopy is a low cost, effective and reliable method that does not require anesthesia (5). SIS,

is another diagnostic and treatment method which can be used in abnormal uterine bleeding and infertility. SIS, can be used as providing distension of the endometrial cavity with sterile saline and visualized the uterine cavity with ultrasonography (6,7).

In our study, the patients who had complaint of abnormal uterine bleeding in their reproductive and perimenopausal period were detected with transvaginal ultrasonography (TVUSG), saline infusion sonohysterography (SIS), Hysteroscopy and Dilatation & Curettage (D&C) as a diagnostic methods and comparing our visual diagnosis with the histopathological diagnosis of tissue obtained by D&C, according to literature information to reveal the accuracy and reliability of these diagnostic methods.

## MATERIAL AND METHOD

Patient in this study was selected between June 2008 and November 2009, in İstanbul Bakırköy Dr. Sadi Konuk Education and Research Hospital Gynecology and Obstetrics Clinic, a total of 74 patients of childbearing age who presented with the disease of abnormal uterine bleeding complaint were included. The study was approved by İstanbul Bakırköy Dr. Sadi Konuk Education and Research Hospital Ethics Committee (date: June 01, 2008; Approval number: 303). All procedures were performed adhered to the ethical rules and the Helsinki Declaration of principles.

Patients who has chronic and systemic disease, continuous use of medication, take hormone replacement therapy, use intrauterine device or using contraceptive medication, pregnant or genital tract infection were not included in the study. The study was carried out in the gynecology service of the hospital, following the approval of the hospital training planning and ethics committee. All patients included the study were informed about the procedure which performed and their complications, and bill of consent was signed. Detailed gynecological anamnesis of all patients were taken, their systemic and pelvic examinations done. TVUSG, SIS, H/S and D&C respectively performed to all patients, obtaining material was send to histopathological evaluation and results were recorded. 14 patient was excluded from the study because they did not accept the intervention in different part of the stages. Study completed with 60 patients.

Transvaginal ultrasonography was performed by single observer using General Electric Logic 200 brand 3.5 mHz vaginal probe. Cervix, cervical canal, myometrium and ovaries were examined in both sagittal and coronal planes. After evaluating the endometrial morphological pattern and endometrial junction, endometrial thickness measured from the outside to the outside in the thickest place (in the longitudinal plane). SIS process performed

early or mid proliferative phase. While the patients were in dorsolithotomy position, a speculum was inserted into their vagina. After the cervix was made visible, wipe it with an antiseptic solution (Povidone iodine) cleaned. The cervix is fixed with a teneculum if necessary and 8 fr catheter was placed in the uterine cavity. After fixing the catheter with forceps, the speculum was removed and a transvaginal ultrasound probe was placed in to the vagina. A 20-50 cc syringes was attached to the tip of the catheter, saline is given slowly into the cavity until sufficient distension was achieved and the findings were recorded. Office hysteroscopy was performed by 3 mm hysteroscope (Karl Storz, Tutlingen, Germany). Office hysteroscopy was performed in the dorsal lithotomy position while the bladder was empty. The procedure was performed after cleaning the External genitals, vagina and cervix with antiseptic solution povidone-iodine. Uterine distention was carried out using saline. After hysteroscopy D&C performed for all patients. The material taken was kept in alcohol and sent to the pathology laboratory. Cases in which sufficient material cannot be obtained, was evaluated as cases with no pathology detected. No complications occurred due to the procedures performed. By comparing our visual diagnosis with the histopathological diagnosis of tissue obtained by dilatation curettage, we tried to reveal the accuracy and reliability of these diagnostic methods in the light of the literature.

### Statistical Analysis

While evaluating the findings obtained in the study, NCSS for statistical analysis 2007 & PASS 2008 Statistical Software (Utah, USA) program was used. While evaluating the study data after H/S in addition to descriptive statistical methods (Mean, Standard deviation) it was handled as biopsy results are the gold standard in comparison of qualitative data. According to TVUSG, SIS and H/S results, diagnostic screening tests for each test separate sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and kappa scores were calculated. Statistical significance was evaluated at the  $p < 0.05$  level.

## RESULTS

Sixty patients with abnormal uterine bleeding were included in the study. All patients consisted of gave birth and fertile women. According to SIS results; 33.3% of patient had normal histology, 16.7% hyperplasia, 46.7% polyps and 3.3% myoma. H/S results; normal histology in 30%, hyperplasia in 13.3%, polyp in 50.0% and myoma in 6.7% of the patient seen. The clinical and demographic characteristics of the patients are given in **Table 1**.

The histopathological distribution of patients who underwent TVUSG, SIS, and H/S are given in **Table 2**.

**Table 1.** Clinical and demographic characteristics of the patients

	Min-Max	Ort±SD (Median)		
Age	32-45	39.70±3.04		
BMI	17.36±29.42	23.43±4.72		
Gravida	2-7	4.0±1.5		
Parity	1-6	2.95±1.05		
Abortus	1-8	4.02±2.86		
Histopathological diagnosis	TVUSG n (%)	SIS n (%)	H/S n (%)	Toplam n:60
Normal	16 (26.7%)	20 (33.3%)	18 (30%)	18 (30.0%)
Hyperplasia	18 (30.0%)	10 (16.7%)	8 (13.3%)	10 (16.7%)
Polyp	22 (36.7%)	28 (46.7%)	30 (50%)	28 (46.7%)
Myoma	4 (6.7%)	2 (3.3%)	4 (6.7%)	4 (6.7%)

TVUSG: Transvaginal ultrasonography, SIS: Saline infusion sonohysterography, H/S: Hysteroscopy

**Table 2.** Histopathological distribution of patients who underwent TVUSG, SIS, and H/S

		Pathology Results				
		Normal n (%)	Hyperplasia n (%)	Polyp n (%)	Myoma n (%)	Total n (%)
TVUSG	Normal	14 (23.3%)	2 (3.3%)	0 (0%)	0 (0%)	16 (26.7%)
	Hperplasia	4 (6.7%)	8 (13.3%)	6 (10%)	0 (0%)	18 (30%)
	Polyp	0 (0%)	0 (0%)	20 (33.3%)	2 (3.3%)	22 (36.7%)
	Myoma	0 (0%)	0 (0%)	2 (3.3%)	2 (3.3%)	4 (6.7%)
	Total	18 (30%)	10 (16.7%)	28 (46.7%)	4 (6.7%)	60 (100%)
SIS	Normal	16 (26.7%)	4 (6.7%)	0 (0%)	0 (0%)	20 (33.3%)
	Hyperplasia	2 (3.3%)	4 (6.7%)	4 (6.7%)	0 (0%)	10 (16.7%)
	Polyp	0 (0%)	2 (3.3%)	24 (40%)	2 (3.3%)	28 (46.7%)
	Myoma	0 (0%)	0 (0%)	0 (0%)	2 (3.3%)	2 (3.3%)
	Total	18 (30%)	10 (516.7%)	28 (46.7%)	4 (6.7%)	60 (100%)
H/S	Normal	18 (30%)	0 (0%)	0 (0%)	0 (%)	18 (30%)
	Hyperplasia	0 (0%)	8 (13.3%)	0 (0%)	0 (0%)	8 (13.3%)
	Polyp	0 (0%)	2 (3.3%)	28 (46.7%)	0 (0%)	30 (50%)
	Myoma	0 (0%)	0 (0%)	0 (0%)	4 (6.7%)	4 (6.7%)
	Total	18 (30%)	10 (16.7%)	28 (546.7%)	4 (6.7%)	60 (100%)

McNemar-Bowker Test p=0.083 p=0.343 p=0.157 p>0,05 TVUSG: Transvaginal ultrasonography, SIS: Saline infusion sonohysterography, H/S:Hysteroscopy

When looking at the efficiency of TVUSG in the diagnosis of endometrial pathologies, sensitivity is 71.42%; specificity is 77.78%, positive predictive value is 88.23%, and negative predictive value is 53.85%. In endometrial hyperplasia, sensitivity is 80%, specificity is 80%, in polyps sensitivity is 71.43% and specificity was evaluated as 93.75%. Sensitivity is 50%, specificity was determined as 96.4% in endometrial myomas. When looking at the effectiveness of SIS in the diagnosis of endometrial pathologies, the sensitivity is 88.89%, specificity 90.48%, positive predictive value 80.00% and the negative predictive value is 95.0%. In endometrial hyperplasia; It was evaluated as sensitivity 40% and specificity 88%. In polyps; sensitivity 85.71%, specificity 87.50%. In endometrial myomas; sensitivity was 50% and specificity was 100%. Considering the effectiveness of hysteroscopy in the diagnosis of endometrial pathologies, sensitivity 100%; specificity is 90%, positive predictive value is 95.24%, and negative predictive value is 100%. In endometrial hyperplasia, sensitivity is 80%, specificity is 100%, and in polyps sensitivity is 100% and specificity was evaluated as 93.75%. Sensitivity

and specificity was determined as 100% in endometrial myomas. Diagnostic accuracy values of TVUSG, SIS, H/S is given in **Table 3**.

**Table 3.** Diagnostic accuracy values of TVUSG, SIS, H/S

	Sensitivity	Specificity	Positive predictive value	Negative predictive value
<b>TVUSG</b>				
Normal	77.78	95.24	87.50	90.91
Hyperplasia	80.00	80.00	44.44	95.24
Polyp	71.43	93.75	90.91	78.95
Myoma	50.00	96.43	50.00	96.43
<b>SIS</b>				
Normal	88.89	90.48	80.00	95.00
Hyperplasia	40.00	88.00	40.00	88.00
Polyp	85.71	87.50	85.71	87.50
Myoma	50.00	100.00	100.00	96.55
<b>H/S</b>				
Normal	100.00	100.00	100.00	100.00
Hyperplasia	80.00	100.00	100.00	96.15
Polyp	100.00	93.75	93.33	100.00
Myoma	100.00	100.00	100.00	100.00

TVUSG: Transvaginal ultrasonography, SIS: Saline infusion sonohysterography, H/S:Hysteroscopy

## DISCUSSION

Irregularities in gonadotropin hormones in women and hyperandrogenemia caused by hyperinsulinemia is a main reason in anovulation. In addition, androgens are converted to estrogen in adipose tissue and increased estrogens have a proliferative and hyperplastic effect on the endometrium. All of these factors together can cause abnormal uterine bleeding in women (8). The estrogen hormone has a stimulating effect on the endometrium. Continuous estrogen stimulation in the endometrium causes many gynecological problems. Estrogen plays a role in the etiopathogenesis of endometrial polyp, which is one of the causes of abnormal uterine bleeding. Increasing estrogens trigger proliferative, hyperplastic and eventually endometrial cancer pathways for the endometrium. Estrogen is one of the most important factors involved in the formation of endometrial cancer precursors such as endometrial cancer and hyperplasia. (9-12) Abnormal uterine bleeding (AUB) is one of the most common reasons for referrals to gynecology outpatient clinics. This clinical situation, which is often an indicator of a pathology in the reproductive system, sometimes it can be a symptom of disorders of other systems (13).

In the evaluation of the uterine cavity, TVUSG can directly detect abnormal uterine structures or it can be used for imaging or detecting anomalies. In general for determining endometrial pathologies, TVUSG sensitivity is reported between 46-100% (14). TVUSG can detect submucous myomas with a sensitivity of 21-100%, specificity range is between 33-100%. Sensitivity for endometrial hyperplasia and cancer is between 33% 100, specificity is between 79-99% (14). Endometrial pathologies of TVUSG, has low diagnostic value particularly in evaluating focal abnormalities, but it has been reported that, this could be the first step method which will reduce the need for invasive procedures (15). In the study of Dijkhuizen et al. (16) in 50 premenopausal women's hysterectomy specimens compared the TVUSG and SIS findings with the pathological examination findings, they detected 13 myomas and 10 polyps, detection of polyps with TVUSG has sensitivity 40%, specificity 100%, positive predictive value (PPV) 100%, negative predictive value (NPV) reported as 87%. Direct detection of endometrial polyps has a low sensitivity with TVUS. In our study, the diagnosis of endometrial pathologies with TVUSG has a sensitivity of 71.42%, and a specificity of 77.78%. Sensitivity and specificity of TVUSG in the diagnosis of submucous myoma 96.43%; sensitivity for endometrial polyp 71.43%, specificity 93.75%. in endometrial hyperplasia, the sensitivity is 80.0% and the specificity is 80.0%, similar rates to the literature has been found.

In determining focal intrauterine pathologies SIS has a prominent advantage over TVUSG. It gives a higher diagnostic accuracy rate in detecting intracavitary lesions. Sensitivity and specificity of TVUSG in the diagnosis of intracavitary lesions reported by Williams et al. (17) as 67% and 93%, it was emphasized by De Vries et al (14) that the same rates were 60% and 93% with TVUSG respectively. As a result, SIS is superior to TVUSG in recognizing intracavitary pathologies, however It is found that SIS is insufficient to recognize endometrial pathologies such as hyperplasia other than polyp and myoma (18). In our study, the efficiency of SIS in determining intracavitary lesions has a sensitivity of 88.89% and specificity of 90.48%. Determination of endometrial polyps sensitivity 85.71% specificity 87.50%, in submucous myomas sensitivity 50%, specificity 100%. In endometrial hyperplasia, sensitivity 40% specificity 88%. These results were also found similar to the literature.

As a sensitive method hysteroscopy is and highly used in the detection of endometrial pathologies in the current literature. In 419 postmenopausal women Garutti et al. (19) performed hysteroscopy for determining endometrial pathologies, in their study sensitivity 96.5%, specificity 93.6%, positive predictive value 92.9% reported as. The purpose of invasive techniques used in patients with abnormal uterine bleeding is to detect benign intrauterine pathologies and especially to determine the diagnosis of endometrium cancer correctly. In recognition of normal and abnormal endometrial structure; sensitivity, specificity, negative predictive value and positive predictive values of H/S is respectively was found as 94.2%, 88.8%, 96.3% and 83.1% (20). Although H/S can detect polyps with a high accuracy rate, it is not sufficient in detecting hyperplasia. In a study Lo et al. (21) showed that the sensitivity and positive predictive value of hysteroscopy without biopsy in diagnosing endometrial carcinoma were only 58.8% and 20.8%, respectively. In another study, the superiority of H/S over D&C in recognizing endometrial hyperplasia and cancer was investigated. It is stated that, in the diagnosis of cancer and hyperplasia the gold standard is D&C but H/S is more sensitive in detecting polyps and fibroids (16).

According to the study of Fukuda et al. (22), as a method hysteroscopy in determining endometrial pathologies has a sensitivity of 90%, specificity of 82% was found. The sensitivity is 95% and specificity is 92% in determination of submucous fibroids, also in determining endometrial hyperplasia it was mentioned that the sensitivity is 97% and specificity 100% (22). Since the sensitivity of hysteroscopy in endometrial hyperplasia is very low, taking biopsy from endometrium is required. Vanderley

et al. in the study where they compared ultrasonography and hysteroscopy in the evaluation of endometrial lesions; 191 patients were included in the study and although the accuracy rate of hysteroscopy in the evaluation of endometrial pathologies was above 90%, TVUSG was 65.9% in endometrial polyps, 71.9% in myomas and in endometrial hyperplasia, it has an accuracy rate of 63.2% (23). According to our study, the effectiveness of hysteroscopy in evaluating endometrial pathologies; sensitivity 100%, specificity 90%, PPD 95.24%, NPD 100% was determined as. In endometrial polyps; sensitivity 100%, specificity 93.75%, in submucous myomas; sensitivity 100%, specificity 100% was found as. In endometrial hyperplasia, it is determined that sensitivity is 80%, specificity is 100%. The results were found to be similar to the literature.

## CONCLUSION

Abnormal uterine bleeding is one of the most common causes of gynecological complaints. In terms of presenting treatment options to the patient, careful diagnosis of uterine cavity pathologies are necessary. According to the results of our study, for diagnosis; firstly an inexpensive and simple method should be chosen, later complicated and expensive methods must be tried. Hysteroscopy is the most reliable method in diagnosis of endometrial pathologies, is also the gold standard in diagnosis-treatment.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study was approved by İstanbul Bakırköy Dr. Sadi Konuk Education and Research Hospital Ethics Committee (date: June 01, 2008; Approval number: 303).

**Informed Consent:** Written informed consent was obtained from all participants who participated in this study.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

**Author Contributions:** All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

## REFERENCES

1. FIGO classification system (PALM-COEIN) for causes of abnormal uterine bleeding in nongravid women of reproductive age. FIGO Working Group on Menstrual Disorders. Munro MG, Critchley HO, Broder MS, Fraser IS. *Int J Gynaecol Obstet* 2011; 113: 3-13.
2. Hillard PJA. Benign diseases of the female reproductive tract: symptoms and signs. In: Berek JS, ed. *Novaks Gynecology*. 13th ed. Philadelphia: Lippincott Williams Wilkins; 2002. p.351-420.
3. Stovall T, Soloman S, Ling F. Endometrial sampling prior to hysterectomy. *Obstet Gynecol* 1989; 73: 405-9.
4. Cacciatore B, Ramsay T, Lehtovirta P, Ylöstalo P. Transvaginal sonography and hysteroscopy in postmenopausal bleeding. *Acta Obstet Gynecol Scand* 1994; 73: 413-16.
5. Oral Ö, Kayabaşoğlu F. Operatif Histeroskopi. *Histeroskopi: Klinik uygulamalar ve güncel yaklaşımlar*. Özyay Oral, Furkan Kayabaşoğlu. İstanbul, Türkiye: İstanbul Tıp Kitabevi; 2010.s: 61-79.
6. Wolman I, Groutz A, Gordon D, Kupfermine MJ, Lessing JB, Jaffa AJ. Timing of sonohysterography in menstruating women. *Gynecol Obstet Invest* 1999; 48: 254-8.
7. Parsons AK, Cullinan JA, Goldstein SR, Fleicher AC. Sonohysterography, sonosalpingography, and sonohysterosalpingography; a map of normal and abnormal findings. In: *Sonography in obstetrics and gynecology: principle and practice*. Fleicher AC, eds. fifth edition. Tennessee 1996: Appleton&Lange
8. Akyol A. Obezite ve kadın üreme sağlığı. *Firat Med J* 2018; 23: 48-53.
9. Ward KK, Roncancio AM, Shah NR, et al. The risk of uterine malignancy is linearly associated with body mass index in a cohort of US women. *Am J Obstet Gynecol* 2013; 209: 579.e1-5.
10. Yang TY, Cairns BJ, Allen N, Sweetland S, Reeves GK, Beral V. Postmenopausal endometrial cancer risk and body size in early life and middle age: Prospective cohort study. *Br J Cancer* 2012; 107: 169-75.
11. Jeong NH, Lee JM, Lee JK, et al. Role of body mass index as a risk and prognostic factor of endometrioid uterine cancer in Korean women. *Gynecol Oncol* 2010; 24-8.
12. World Cancer Research Fund/American Institute for Cancer Research. Continuous Update Project Report. Food, Nutrition, Physical Activity, and the Prevention of Endometrial Cancer. 2013. (Erişim tarihi: 16.04.2020 <https://www.wcrf.org/sites/default/files/Endometrial-Cancer-2013-Report.pdf>.)
13. Munro MG, Critchley HOD, Fraser IS. The two FIGO systems for normal and abnormal uterine bleeding symptoms and classification of causes of abnormal uterine bleeding in the reproductive years: 2018 revisions. *Int J Gynecol Obstet* 2018; 143: 393-408.
14. de Vries LD, Dijkhuizen FP, Mol BW, et al. Comparison of transvaginal sonography, saline infusion sonography, and hysteroscopy in premenopausal women with abnormal uterine bleeding. *J Clinl. Ultrasound* 2000; 28: 217-23.
15. Dijkhuizen FP, Brolmann HA, Potters AE, et al. The accuracy of TVUS in the diagnosis of endometrial abnormalities. *Obstet Gynecol* 1996; 87: 345-9.
16. Dijkhuizen FP, de Vries LD, Mol BW et al. Comparison of transvaginal ultrasonography and saline infusion sonography for the detection of intrauterine abnormalities in premenopausal women. *Ultrasound Obstet Gynecol* 2000; 15: 372-6.
17. Williams CD, Mashburn PB. A prospective study of transvaginal hydrosonography in the evaluation of abnormal uterine bleeding. *Am J Obstet Gynecol* 1993; 179: 292-4.

18. Ahmet K, Erdin İ, Hakan KE, Can T, Figen T. Anormal uterin kanamalı kadınların değerlendirilmesinde, TVUSG, HSG ve endometrial biyopsinin karşılaştırılması. *TJOD* 2005; 2: 327-31.
19. Garutti G, Sambruri I, Cellari F, et al. Hysteroscopy and transvaginal ultrasonography in postmenopausal women with uterine bleeding. *Int J Gynecol Obstet* 1999; 65: 25-33.
20. Garuti G, Sambruni I, Colonnelli M, et al. Accuracy of hysteroscopy in predicting histopathology of endometrium in 1500 women. *J Am Assoc Gynecol Laparosc* 2001; 8: 207-13.
21. Lo KWK, Yuen PM. The role of outpatient diagnostic hysteroscopy in identifying anatomie pathology and histopathology in the endometrial cavity. *J Am Assoc Gynecol Laparoscopist* 2000; 7: 381-5.
22. Ben-Yehuda OM, Kim YB, Leuchter RS. Does hysteroscopy improve upon the sensitivity of dilatation and curettage in the diagnosis of endometrial hyperplasia or carcinoma?. *Gynecol Oncol* 1998; 68: 4-7.
23. Fukuda M, Shimizu T, Fukuda K, et al. Transvaginal hysterosonography for differential diagnosis between submucous and intramural myoma. *Gynecol Obstet Invest* 1999; 35: 236-9.
24. Wanderley M da S, Álvares MM, Vogt M de FB, et al. Accuracy of transvaginal ultrasonography, hysteroscopy and uterine curettage in evaluating endometrial pathologies. *Rev Bras Ginecol E Obstetrícia* 2016; 38: 506-11.