

Accuracy of Transvaginal Ultrasonography, Hysteroscopy and Uterine Curettage in Evaluating Endometrial Pathologies

Acurácia da ultrassonografia transvaginal, histeroscopia e curetagem uterina na avaliação de patologias endometriais

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Abstract

Keywords

- ▶ endometrial polyp
- ▶ submucous myoma
- ▶ endometrial hyperplasia
- ▶ transvaginal ultrasonography
- ▶ hysteroscopy
- ▶ uterine curettage
- ▶ accuracy

Objective To evaluate the accuracy of transvaginal ultrasonography, hysteroscopy and uterine curettage in the diagnosis of endometrial polyp, submucous myoma and endometrial hyperplasia, using as gold standard the histopathological analysis of biopsy samples obtained during hysteroscopy or uterine curettage.

Methods Cross-sectional study performed at the Hospital Universitário de Brasília (HUB). Data were obtained from the charts of patients submitted to hysteroscopy or uterine curettage in the period from July 2007 to July 2012.

Results One-hundred and ninety-one patients were evaluated, 134 of whom underwent hysteroscopy, and 57, uterine curettage. Hysteroscopy revealed a diagnostic accuracy higher than 90% for all the diseases evaluated, while transvaginal ultrasonography showed an accuracy of 65.9% for polyps, 78.1% for myoma and 63.2% for endometrial hyperplasia. Within the 57 patients submitted to uterine curettage, there was an accuracy of 56% for polyps and 54.6% for endometrial hyperplasia.

Conclusion Ideally, after initial investigation with transvaginal ultrasonography, guided biopsy of the lesion should be performed by hysteroscopy, whenever necessary, in order to improve the diagnostic accuracy and subsequent clinical management.

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Resumo

Objetivo avaliar a acurácia da ultrassonografia transvaginal, da histeroscopia e da curetagem uterina no diagnóstico de pólipos endometriais, mioma submucoso e hiperplasia de endométrio, utilizando como padrão-ouro a análise histopatológica de amostras obtidas por biópsia realizada durante a histeroscopia ou a curetagem.

Métodos estudo transversal realizado no Hospital Universitário de Brasília (HUB), cujas informações foram obtidas nos prontuários das pacientes que foram submetidas à histeroscopia ou curetagem uterina no período de julho de 2007 a julho de 2012.

Resultados Foram avaliadas 191 pacientes, sendo que 134 foram submetidas à histeroscopia e 57 à curetagem uterina. Observou-se acurácia diagnóstica maior que 90% para todas as patologias avaliadas por histeroscopia, enquanto que por ultrassonografia transvaginal observou-se acurácia de 65,9% para pólipo, 78,1% para mioma e 63,2% para hiperplasia endometrial. Nas 57 pacientes submetidas a curetagem uterina, observou-se acurácia de 56% para pólipo e de 54,6% para hiperplasia endometrial.

Conclusão Idealmente, após a investigação inicial com ultrassonografia transvaginal, deveria, sempre que necessário, ser realizada histeroscopia com biópsia guiada da lesão, o que melhoraria a acurácia diagnóstica e posterior conduta clínica.

Palavras-chave

- ▶ pólipo endometrial
- ▶ mioma submucoso
- ▶ hiperplasia endometrial
- ▶ ultrassonografia transvaginal
- ▶ histeroscopia
- ▶ curetagem uterina
- ▶ acurácia

Introduction

Uterine pathologies, such as endometrial polyps, myomas, synechiae, hyperplasia and endometrial cancer, are relatively frequent morbidities in the female population, both in reproductive-aged women and postmenopausal ones.¹

The available methods for evaluation of the uterine cavity have developed considerably over the last few years. Transvaginal ultrasonography is currently used as a method of choice for investigation of the endometrium, either in cases of genital bleeding, or for screening in asymptomatic women, especially in the postmenopause.² It is a non-invasive method, well tolerated by patients and it allows immediate interpretation of the observed images. However, there are conflicting reports regarding its diagnostic accuracy.³⁻⁵

Hysteroscopy has the advantage of providing a direct visualization of the uterine cavity and the endometrium, allowing guided biopsy of any suspected lesion. However, it is an invasive procedure, relatively expensive, which demands specific equipment and trained staff and even in big cities it is not available for the entire population.

Uterine curettage has been, for decades, the universal procedure for diagnosis of intrauterine diseases. Although simpler than the former, it is an invasive procedure as well. It has the disadvantage of being blind, therefore, the surgeon is not able to remove or even detect the entire lesion. However, one cannot ignore the fact that it is a procedure available in the vast majority of Brazil's public health services and the gynecologists, in general, are entitled to perform it.

The present study aims to evaluate the accuracy of transvaginal ultrasonography, hysteroscopy and uterine curettage in the diagnosis of endometrial polyp, submucous myoma, and endometrial hyperplasia, using as gold standard the histopathological analysis of biopsy sample obtained during hysteroscopy or uterine curettage.

Methods

This is a cross-sectional study performed at the Hospital Universitário de Brasília (HUB). Data were obtained from the charts of patients submitted to hysteroscopy or uterine curettage in the period from July 2007 to July 2012.

According to the inclusion criteria, the subjects of the study were women with ultrasound scans performed at HUB and/or other health public services of the Federal District whose diagnoses were compatible with endometrial polyp, endometrial thickening or submucous myoma. For the purposes of assessment of endometrial thickness, the maximum of 5 mm in postmenopausal women, and 15 mm in premenopausal were considered normal.^{6,7}

The exclusion criteria were: patients suffering from pathologies other than those mentioned above; those lacking the reports of the transvaginal ultrasonography and hysteroscopy and those missing histopathological reports obtained during hysteroscopy or uterine curettage; patients with cervical diseases; patients with pelvic inflammatory disease; patients with previous diagnosis of endometrial carcinoma or in treatment for endometrial hyperplasia, and patients under 18 years of age.

Submucous myoma cases found in transvaginal ultrasonography reports were referred to hysteroscopy, while the surgical indication for polyp and endometrial thickening depended on the availability of the method at the time.

Hysteroscopy was performed under spinal anesthesia or sedation using a 30° hysteroscope with a 5 mm diagnostic sheath. The uterine cavity was distended with 3% mannitol and endometrial biopsies were taken under direct vision using a resectoscope. Uterine curettage was also performed under spinal anesthesia or sedation with conventional curette and blind biopsy of the uterine cavity.

Transvaginal ultrasonography and hysteroscopy reports compatible with endometrial thickening were related to endometrial hyperplasia for the purposes of histopathological analysis.

Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of transvaginal sonography, hysteroscopy and uterine curettage were calculated. Data were given a 95% confidence interval and histopathological reports were considered as the gold standard. For these procedures STATA Statistical Software version 11.0 (Stata-Corp LP, College Station, TX) was employed.

The study was approved by the Committee of Ethics in Research in Human Beings of the Faculdade de Ciências da Saúde da Universidade de Brasília (179/2011 record).

Results

A total of 191 women were enrolled in the study, 134 of whom underwent hysteroscopy and 57, uterine curettage. The mean age of the patients was 49 ± 12 years old (range 25 to 86 years), 99 were married and 70 were multiparous (≥ 4 pregnancies).

In terms of symptoms, 101 patients (52.9%) were asymptomatic, 69 reported abnormal uterine bleeding, 13 had chronic pelvic pain, 3 reported dyspareunia and 11 had varied complaints, that is, the patient reported more than one symptom.

Of the 134 patients with abnormal findings in the transvaginal ultrasonography who underwent hysteroscopy, 25 showed normal uterine cavity. Of the 48 patients whose transvaginal ultrasonography revealed endometrial thickening, hysteroscopy diagnosed 16 polyps, 3 myomas and 12 cases of normal endometrium (**Table 1**).

Hysteroscopy revealed diagnostic accuracy higher than 90% for all the evaluated diseases, while transvaginal ultrasonography demonstrated accuracy of 65.9% for polyp, 78.1% for myoma and 63.2% for endometrial hyperplasia (**Table 2**).

In 26 of the 57 patients whose transvaginal ultrasonography had revealed polyps, and who underwent uterine curettage, a histopathological diagnosis could be confirmed in 14 cases; in 6 of them, there was normal endometrium, and in 2, there was insufficient material for evaluation. In 15 cases, in which normal endometrium was observed by histopathologic analysis, transvaginal ultrasonography detected polyp or endometrial thickening (**Table 3**).

It was observed accuracy of 56% for polyp and 54.6% for endometrial hyperplasia in 57 patients who underwent uterine curettage (**Table 4**).

Discussion

Transvaginal ultrasonography revealed sensitivity of 71.4% for endometrial polyp and 57.9% for submucous myoma, while specificity was 60.3 and 98.2%, respectively, in our study. Great variability has been observed in the literature, both in sensitivity and specificity, for the diagnosis of these pathologies.^{1,8-10} In addition, the accuracy of the method was shown to be moderate in the diagnosis of endometrial polyp and submucous myoma, similarly to other studies.^{1,8}

Ultrasound examination is a noninvasive diagnostic method, well tolerated, relatively low-cost and universally considered the first choice in the initial evaluation of uterine structural pathologies.¹¹ However, the ability of transvaginal ultrasonography to distinguish among the many causes of thickened endometrium has been questioned,^{8,12} and various endometrial pathologies with a significant number of false positive and false negative diagnoses have been observed, particularly polyps and endometrial hyperplasia.^{8,13}

In this study, only 17 of the 48 patients whose transvaginal ultrasonography revealed endometrial thickening, who subsequently underwent hysteroscopy and biopsy, effectively presented endometrial hyperplasia. Polyps, small myomas and normal endometrium were masked by a thick endometrium. Similarly, of the 71 polyps demonstrated in the transvaginal ultrasonography, only 37 were confirmed by biopsy performed during hysteroscopy. The findings of the ultrasound examination, therefore, led to a considerable number of false positive diagnoses concerning endometrial hyperplasia (PPV = 15.6%) and endometrial polyp (PPV = 62.5%).

The diagnostic accuracy of the method was 63.2% for endometrial hyperplasia, with sensitivity of 58.3% and specificity of 68.1%, lower than the results of Soguktas et al⁶ and Bingol et al⁸ and similar to those of Grimbizis et al¹⁰, while Kasraeian et al² observed sensitivity of 55% for simple hyperplasia and 44.4% for atypical hyperplasia.

In addition, although 4 histopathological reports of endometrial cancer have been observed, no ultrasound report was suggestive of malignancy in 191 exams performed, similarly to the study of Grimbizis et al¹⁰, in which transvaginal

Table 1 Agreement between transvaginal ultrasonography and hysteroscopy performed in 134 patients

Transvaginal Ultrasonography	Hysteroscopy					Total
	Polyp	Hyperplasia	Myoma	Normal	Others	
Polyp	37	19	3	11	1	71
Hyperplasia	16	17	3	12	—	48
Myoma	—	—	11	1	—	12
Others	—	2	—	1	—	3
Total	53	38	17	25	1	134

Table 2 Diagnostic accuracy parameters (%) of transvaginal ultrasonography and hysteroscopy performed in 134 patients (95% confidence interval)

	Transvaginal Ultrasonography	Hysteroscopy
Endometrial polyp		
Sensibility (%)	71.4 (58.7–82.1)	84.4 (73.1–92.2)
Specificity (%)	60.3 (47.7–72)	100 (94.9–100)
PPV* (%)	62.5 (50.3–73.6)	100 (93.4–100)
NPV** (%)	69.5 (56.1–80.8)	87.5 (78.2–93.8)
Accuracy (%)	65.9 (57.7–74)	92.2 (87.7–96.7)
Submucous myoma		
Sensibility (%)	57.9 (33.5–79.7)	89.5 (66.9–98.7)
Specificity (%)	98.2 (93.7–99.8)	100 (96.8–100)
PPV* (%)	84.6 (54.6–98.1)	100 (80.5–100)
NPV** (%)	93.2 (87.1–97)	98.3 (94–99.8)
Accuracy	78.1 (66.6–89.5)	94.7 (87.6–100)
Endometrial hyperplasia		
Sensibility (%)	58.3 (27.7–84.8)	100 (75.3–100)
Specificity (%)	68.1 (58.9–76.3)	80.2 (71.9–86.9)
PPV* (%)	15.6 (6.4–29.5)	35.1 (20.2–52.5)
NPV** (%)	94.2 (87–98.1)	100 (96.3–100)
Accuracy (%)	63.2 (48–78.4)	90.1 (86.5–93.6)

*PPV-positive predictive value;

**NPV-negative predictive value.

Table 3 Agreement between transvaginal ultrasonography and histological diagnosis after uterine curettage performed in 57 patients

Transvaginal Ultrasonography	Histological Diagnosis					Total
	Polyp	Hyperplasia	Myoma	Normal	Others/ Inconclusive	
Polyp	14	3	1	6	2	26
Hyperplasia	11	6	1	9	3	30
Others/Inconclusive	1	–	–	–	–	1
Total	26	9	2	15	5	57

Table 4 Uterine curettage accuracy (%) for diagnosing endometrial polyp and endometrial hyperplasia in 57 patients (95% confidence interval)

	Endometrial polyp	Endometrial hyperplasia
Sensibility (%)	52 (31.3–72.2)	62.5 (24.5–91.5)
Specificity (%)	60 (40.6–77.3)	46.8 (32.1–61.9)
PPV* (%)	52 (31.3–72.2)	16.7 (5.6–34.7)
NPV** (%)	60 (40.6–77.3)	88 (68.8–97.5)
Accuracy (%)	56 (43–69)	54.6 (35–74)

*PPV-positive predictive value;

**NPV-negative predictive value.

ultrasonography was also not able to discriminate hyperplasia or endometrial cancer from other intracavitary lesions.

Hysteroscopy, on the other hand, presented diagnostic accuracy higher than 90% in all the studied pathologies. Similar results, demonstrating the superiority of this examination versus transvaginal ultrasonography in terms of diagnosis of those endometrial pathologies have been observed,^{3,6,8,10} although other studies^{5,9} have concluded that the combination of both methods did not seem to improve the results regarding endometrial polyps.

However, it must not be forgotten that hysteroscopy is an invasive procedure, usually performed under anesthesia and an operator-dependent technique. Physicians were not always able to distinguish easily a proliferative endometrium from a hyperplasic one.¹⁴ A polypoid functional endometrium can mimic small polyps.¹⁵ Endometrial hyperplasia does not have specific hysteroscopy presentation, and may present as "polyp-like" lesion, or an irregularly thick endometrium.¹⁶ Thus, although the feasibility of hysteroscopy as a "one stop diagnosis" method¹⁷ is still debated, the most accepted argument seems to be that, in all cases, an endometrial biopsy sample should be obtained during the procedure to confirm the diagnosis.^{15,18}

We agree with that approach, especially given that the four endometrial cancers diagnosed in the histopathology analysis were not observed in the hysteroscopy, perhaps hidden amid a thickened endometrium. Besides, the positive predictive values of both hysteroscopy and transvaginal ultrasonography, regarding endometrial hyperplasia, were very low. Corroborating these findings, de Borges et al¹⁹ observed that both techniques showed low accuracy in predicting malignancy in focal lesions.

The high sensitivity and specificity observed in our analysis, similarly to other studies^{20,21}, indicated that hysteroscopy is a valuable tool for diagnosing polyp and myoma. However, Clark et al²² pointed out that hysteroscopy may not be the best tool for evaluating endometrial hyperplasia, and recent meta-analysis¹⁶ concluded that hysteroscopy seemed more capable to exclude endometrial hyperplasia than to positively identify it.

In the diagnosis of polyps and endometrial hyperplasia, uterine curettage demonstrated accuracy of 56% and 54.6%, respectively, which is lower than the accuracy found in transvaginal ultrasonography. And it is known that, in both methods, small structural abnormalities may not be properly diagnosed or the exact location of the lesion may not be set or assessed.¹⁵

Karageyim Karsidag et al¹⁵ observed sensitivity of 47%, specificity of 68%, and accuracy of 58% in diagnosing intracavitary abnormalities in uterine curettage, and 65% of endometrial polyps and submucous myomas were missed in the procedure. Similarly, Epstein et al²³ observed that curettage failed to detect 58% of polyps, 50% of hyperplasia and 11% of endometrial cancers. In another study,²⁴ 52.7% of intrauterine disorders have not been diagnosed by blind curettage.

We found that 9 out of the 30 patients who underwent uterine curettage due to endometrial thickening at transvaginal ultrasonography presented normal endometrium in the histopathological analysis. However, it does not mean

that the samples represent exactly the whole intrauterine cavity tissue. Bettocchi et al²⁵ observed that major intrauterine diseases were missed in 62.5% of the cases and all endometrial disorders were presented in the hysterectomy specimens. In the study of Lee et al²⁶, only 5.1% of endometrial polyps were diagnosed by curettage.

In addition, recent meta-analysis and systematic review²⁷ observed that in women with postmenopausal bleeding, endometrial sampling obtained by curettage or hysteroscopy to detect benign or malignant endometrial diseases has very low sensitivity and greater efforts are necessary to correctly diagnose focal pathologies, particularly after a benign result.

Some limitations of our study must be mentioned. The first is that 52.9% of the patients were asymptomatic. However, in studies that evaluated asymptomatic patients, symptomatic patients, or both, the results did not differ substantially from ours regarding the accuracy of the diagnostic methods.^{1,2,8-10,15}

Since high frequency ultrasound examination has been performed in outpatients, an increased number of intracavitary disorders or thickened endometrium has been identified in asymptomatic women. However, there is still no consensus on when a histological evaluation is needed.²⁸

Current guidelines about how to deal with the finding of a thick endometrial echo in the ultrasound exam of nonbleeding postmenopausal patients does not automatically require a sample tissue examination.²⁹ Nevertheless, Kasraeian et al² observed that 17.4% of asymptomatic postmenopausal women had some kind of endometrial pathology detected by endometrial biopsy and postulated the importance of that finding, since the patients can remain asymptomatic for a long period of time, and early detection of carcinomas and hyperplasia could improve patients' prognosis.

Although we had observed 16 normal endometria (proliferative or secretory ones) and 7 myomas, 11 cases simple of hyperplasia were also observed, with and without atypia, besides an endometrial carcinoma in an asymptomatic patient.

Another limitation is that the transvaginal ultrasonography exams were performed by different professionals in distinct healthcare clinics of the Federal District, and the uterine curettages were performed by doctors with varying degrees of experience, including residents. Paradoxically, this is also where the strength of our study lies, since it reflects a common situation of public services in our region.

Hysteroscopy was performed whenever possible, but because of the limited availability of hysteroscopes and of well trained professionals in our service, the substantial increase in the demand for the procedure, the lack of equipment or qualified physicians in other hospitals, and the need of a proactive action, a considerable number of uterine curettages had to be performed instead.

However, this strategy proved not to be the best, as intracavitary lesions were found in 77.7% of the 27 patients submitted to transvaginal ultrasonography after uterine curettage. Similarly, Epstein et al²³, whose approach consisted in performing hysteroscopy after curettage, observed that 87% of focal lesions remained in the cavity, and Bettocchi et al²⁵, analyzing species of hysterectomy after curettage,

observed that all uterine disorders were still present in the uterus removed.

Despite the size of the sample, our results confirm the inadequacy of uterine curettage as a diagnostic and therapeutic tool for intrauterine diseases. The results also reinforce the need for greater investments in training and enabling physicians and residents to perform hysteroscopy, as this procedure allows direct visualization of the cavity and sampling of any possible suspicious lesions, which would improve the diagnostic accuracy and subsequent clinical conduct.

Thus, ideally, after a transvaginal ultrasonography as first procedure, if necessary, a hysteroscopy with directed biopsy should be performed. The adoption of this measure is expected to improve the diagnostic accuracy and later clinical management.

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