

COMPARATIVE STUDY OF TRANSVAGINAL ULTRASOUND AND OUTPATIENT HYSTEROSCOPY FOR DIAGNOSING PATHOLOGIC ENDOMETRIAL LESIONS IN POSTMENOPAUSAL WOMEN

DANIELA ANGERAME YELA^{1*}, SIMONE HIDALGO RAVACCI², ILZA MARIA URBANO MONTEIRO³, KELLY CRISTINE HIROSE MARQUES PEREIRA⁴, JOSE ROBERTO ERBOLATO GABIATTI⁵

Study conducted at Universidade Estadual De Campinas – UNICAMP

ABSTRACT

OBJECTIVE. To compare the effectiveness of transvaginal ultrasound and outpatient diagnostic hysteroscopy in the diagnosis of intrauterine diseases in postmenopausal women.

METHODS. The sample consisted of 243 postmenopausal women who submitted to diagnostic hysteroscopy in the year of 2006. All the women were referred from primary healthcare units after submitting to transvaginal ultrasound to assess the endometrial cavity.

RESULTS. The mean age of women was 61 ± 9.4 years, and the mean time since entering menopause was 11 ± 8.3 years. We observed endometrial hyperplasia and endometrial cancer in 6.6% of cases. Ultrasound presented 95.6% sensitivity, 7.4% specificity, positive predictive value of 53.3% and negative predictive value of 60%, whereas hysteroscopy presented 95.7%; 83%; 82.2% and 95.9%, respectively.

CONCLUSION. Hysteroscopy showed superior accuracy compared to ultrasound in the diagnosis of endometrial diseases.

KEYWORDS: Ultrasound. Hysteroscopy. Uterine diseases.

*Correspondence:

Rua Alexandre Flemming,
101 - Cidade Universitária
Campinas - SP
13084-881
Telefone: (19) 35219306
yela@unicamp.br

INTRODUCTION

Transvaginal ultrasound has proved to be a non-invasive method, with good accuracy in the diagnosis of endometrial abnormalities in postmenopausal women.¹ When the ultrasound detects an endometrial thickness over 4 or 5 mm, endometrial abnormalities such as polyps, myomas, hyperplasia, and endometrial cancer are ruled out.^{2,3}

In western nations, endometrial cancer is the most prevalent lower genital tract neoplasm in postmenopausal women. Vaginal bleeding is a common symptom in women with endometrial cancer. This is one of the main reasons for women to visit a gynecologist, although its most frequent causes are endometrial atrophy and benign endometrial lesions, and only 7% to 10% of cases are caused by endometrial carcinoma.⁴⁻⁶

When diagnosing any alteration in the endometrial cavity, physicians must continue physical examination until they are able to rule out the diagnosis, thus ensuring benignity. For this purpose, there is a range of complementary tests, such as endometrium biopsy, curettage and diagnostic hysteroscopy.⁷

Hysteroscopy allows for endoscopic evaluation of the uterine cavity, with the advantage of video recording, which makes it possible to obtain a second opinion. This test can be conducted in a clinic regime, and can be well tolerated without requiring anesthesia. Direct visualization of the uterine cavity allows for the diagnosis of cancer, as well as other diseases, such as polyps and submucosal myomas.⁸

Although this is a more precise test, its access is limited to the Brazilian population, once few centers have the required technology. Some of these diseases, such as endometrial cancer, require earlier diagnosis for better prognosis. Therefore, the present study aims to evaluate, in postmenopausal women, the effectiveness of transvaginal ultrasound compared to outpatient hysteroscopy in diagnosis of these diseases in order to provide earlier treatment for patients.

METHODS

The retrospective study was conducted under a diagnostic test design. This study was approved by the Research Committee

1. Mestrado - Médico assistente da Universidade Estadual de Campinas – UNICAMP, São Paulo, SP
2. Mestrado - Médica Hospital Estadual Sumaré, São Paulo, SP
3. Livre-Docente da Universidade Estadual de Campinas – UNICAMP, Campinas, SP
4. Aluna da Universidade Estadual de Campinas - UNICAMP.Campinas, SP
5. Doutorado - Docente da Universidade Estadual de Campinas - UNICAMP.Campinas, SP

and Ethics Committee at Unicamp. All outpatient diagnostic hysteroscopies performed from January to December of 2006 were surveyed, and 274 postmenopausal women were selected. From these, 18 were excluded because ultrasound results were missing from the file and 13 others were excluded because it was not viable to perform the hysteroscopy without anesthesia, due to pain or cervical stenosis. Therefore, 243 women were included in the study.

These women were referred from Primary Healthcare Units in the city of Campinas, where they had been submitted to routine ultrasonographic test to evaluate the endometrial cavity, and presented alterations in test results or bleeding following the test. The ultrasound was performed transvaginally, and evaluated the endometrial lining, uterine size and volume, and abnormalities in uterine cavity and muscles, in addition to ovaries, as required by the standards of the Brazilian Society of Radiology. Women were then submitted to outpatient diagnostic hysteroscopy, using a 4-mm, 30-degree optical system (Storz Endoscopy), without anesthesia. Carbon dioxide uterine distension was used, with an insufflator that maintains a 60 to 100 mmHg pressure in the uterine cavity.

Hysteroscopy made it possible to evaluate the type of endometrium (atrophic, proliferative, hypertrophic) and the presence of alterations such as polyp, myoma, synechiae and uterine septum, as well as foreign bodies such as intrauterine device and alterations in the shape of the uterus according to the Brazilian consensus on gynecologic videoendoscopy.⁹

Only 14 of these hysteroscopies required anesthesia, either because women could not tolerate the pain or due to cervical stenosis.

From the 125 women with a diagnosis of polyp or submucosal myoma, 118 were submitted to surgical hysteroscopy and the material was sent for pathological examination, considered a gold standard. Endometrial biopsies were carried out for all cases of suspected cancer.

The statistical analysis considered sensitivity, specificity, positive predictive value, negative predictive value and accuracy, with the pathological examination considered as gold standard. These procedures were carried out with the use of SAS version 9.1.3 considering a significant level (α) of 0.05 and power ($1-\beta$) of 0.80.

RESULTS

The mean age of the women was 61 ± 9.4 years (43 to 84 years) and mean time since entering menopause was 11 years. The characteristics of these women are listed in Table 1.

Among these women, 52% suffered from hypertension, 15% suffered from diabetes, 32% had breast cancer and 26% were using tamoxifen, and 5% were undergoing hormone therapy. Most of the women who underwent outpatient diagnostic hysteroscopy were asymptomatic (76%), 23% reported vaginal bleeding (56) and 1% reported other causes (pelvic pain, IUD, mucorrhea).

The cutoff point for abnormal findings was a 5 mm endometrial thickness. In this sample, 4% of cases presented endometrial thickness below 5 mm, 47% presented endometrial thickness of 5 to 10 mm, and 33% presented endometrial thickness above 10 mm. Endometrial thickening was observed in 8% of cases (value

Table 1. Characteristics of the 243 postmenopausal women who underwent ultrasound and diagnostic hysteroscopy for endometrial cavity evaluation.

Characteristics	Mean (SD)	Minimum	Maximum
Age	61 (9,4)	43	84
Age at menopause	49 (4,7)	27	60
Time since menopause	11,3 (8,3)	1	42
Gestation	3,7 (3,1)	0	18
Parity	3,2 (2,6)	0	13
C-sections	0,4 (0,9)	0	4
Abortions	0,4 (0,8)	0	5
BMI	29,8 (5,6)	17,6	49,8

BMI – body mass index

was not reported) and in 8% of cases there was no information on endometrial lining.

From the 235 women whose ultrasound results showed alterations, 96 presented normal hysteroscopy, and from the 8 women whose ultrasound results were normal, 4 presented some alteration in diagnostic hysteroscopy. Ultrasound and diagnostic hysteroscopy findings can be found in Table 2.

Endometrial hyperplasia and endometrial cancer was observed in 6.6% of cases, and half of these were diagnosed by outpatient diagnostic hysteroscopy, through endometrium biopsy. All the women were either overweight or obese, 50% reported bleeding and 70% suffered from hypertension. Among women who underwent surgical hysteroscopy, 40% of cases were diagnosed with polyp, confirmed by pathological examination.

Ultrasound showed high sensitivity and low specificity, with accuracy of 53.7%, whereas hysteroscopy showed high sensitivity and specificity, with accuracy of 88.7%. The results of the diagnostics tests can be found in Table 3.

DISCUSSION

Ultrasound has been used as a diagnostic tool for various gynecological disorders. Various studies have established correlation between endometrial thickness and the presence of intracavitary diseases in curettage material. Nevertheless, ultrasound does not allow for exact diagnosis, it is only a method which can indicate some abnormality in the uterine cavity or endometrium^{10,11,12}.

We observed that, from the 235 women whose ultrasound results presented alterations, 40% showed normal hysteroscopy results. Gumus et al. have observed that, from 77 ultrasound results with alterations, 27% of hysteroscopy results were normal, and Timmermans observed that, from

Table 2. Results found in ultrasound and diagnostic hysteroscopy of menopausal women.

Ultrasound diagnosis	Diagnostic		Hysteroscopy		
	Normal (%)	Polyp (%)	Myoma (%)	Endometrial hyperplasia (%)	Endometrial cancer (%)
Endometrial thickening	90 (37,3)	111 (45,7)	2 (0,8)	3 (1,2)	3 (1,2)
Polyp	5 (2)	13 (5,4)	1 (0,4)	0	0
Intramural myoma	0	1 (0,4)	1 (0,4)	0	0
Thickening and polyp	1 (0,4)	4 (1,6)	0	0	0
Normal	4 (1,6)	2 (0,8)	1 (0,4)	1 (0,4)	0

Table 3. Diagnostic indices found in ultrasound and hysteroscopy in menopausal women.

Diagnostic test	Ultrasound (CI 95%)	Hysteroscopy (CI 95%)
Sensitivity	95,6 (90,6-98,4)	95,7 (90,2-98,6)
Specificity	7,4 (3,4-13,5)	83,0 (75,7-88,8)
PPV	53,3 (46,8-59,7)	82,2 (74,7-88,3)
NPV	60,0 (32,3-83,7)	95,9 (90,7-98,7)
Accuracy	53,7 (32,3-83,7)	88,7 (90,7-98,7)

CI – confidence interval, PPV – positive predictive value, NPV – negative predictive value.

170 ultrasound results with alterations, 47% of hysteroscopy results were normal^{13,14}.

In our study, ultrasound showed lower accuracy compared to hysteroscopy (53.7% and 88.7%, respectively) for the diagnosis of intrauterine pathologies in these women. The literature also offers similar results, in which hysteroscopy shows higher accuracy than ultrasound.¹⁵⁻¹⁷

We observed that ultrasound presented a 95.6% sensitivity and a 7.4 specificity, whereas hysteroscopy showed a 95.7 sensitivity and 83% specificity for the diagnosis of intrauterine diseases.

The study noted that both methods present high sensitivity, however hysteroscopy is significantly more specific than ultrasound. The low specificity (7.4%) observed for ultrasound is due to the fact that women who were referred from Primary Health-care Units had shown alterations in ultrasound results, and only eight of them presented normal ultrasound results. A study with asymptomatic postmenopausal women has shown 59.7% and 91% sensitivity for ultrasound and hysteroscopy, and 35.5% and 82% specificity, respectively,¹⁸ while a different study has shown 60% and 100% sensitivity and 32.6% and 46.2% specificity for ultrasound and hysteroscopy, respectively.¹⁹

In women with postmenopausal bleeding, studies have also shown lower specificity for ultrasound. A study with 419 women has shown a 95.1% sensitivity and 54.8% specificity for ultrasound compared to 96.5% and 93.6% for a hysteroscopy.¹⁷

Another study has shown that ultrasound presented a 100% sensitivity and 75% specificity while hysteroscopy presented 97% sensitivity and 88% specificity.¹ Cacciatore has found a sensitivity of 86.9% and a specificity of 91.7% for ultrasound diagnosis for intrauterine diseases, versus a sensitivity of 73.9% and specificity of 95.7% for diagnostic hysteroscopy.²⁰

In 752 women with postmenopausal bleeding, ultrasound has shown 89% sensitivity and 86% specificity, while hysteroscopy has shown 98% sensitivity and 91% specificity.¹⁵

For the present study we observed 3% of endometrial cancer cases, 3.6% endometrial hyperplasia and 54% endometrial polyp. In the literature, these percentages are consistent with our findings. Cepni has observed 55% endometrial polyp, 2% endometrial cancer and 7% endometrial hyperplasia in his sample, while the percentages found by Angioni were 41%, 4.7% and 18%, respectively, and a study by Mattinger, in turn, found values of 79%, 3% and 6.5%.^{6,19,21} A systematic review that analyzed 65 studies with 26346 women, observed 3.9% of endometrial cancer cases.²² All women with endometrial cancer in our study presented endometrial lining above 5 mm. A meta-analysis with 35 studies (5892 women) showed that 96% of women with endometrial cancer presented endometrial lining thickness above 5 mm.²³

CONCLUSION

This study concluded that hysteroscopy showed superior accuracy compared to ultrasound in the diagnosis of endometrial diseases.

No conflict of interest declared concerning the publication of this article.

REFERENCES

1. Karlsson B, Granberg S, Hellberg P, Wikland M. Comparative study of transvaginal sonography and hysteroscopy for the detection of pathologic endometrial lesions in women with postmenopausal bleeding. *J Ultrasound Med*. 1994;13:757-62.
2. Gupta J K, Chien P F W, Voit D, Clark T J, Khan K S. Ultrasonographic endometrial thickness for diagnosis of endometrial pathology in women with postmenopausal bleeding: a meta-analysis. *Acta Obstet Gynecol Scand*. 2002;81:799-816.
3. O'Connell L P, Fries M H, Zeringue E, Brehm W. Triage of abnormal postmenopausal bleeding: a comparison of endometrial biopsy and transvaginal sonohysteroscopy versus fractional curettage with hysteroscopy. *Am J Obstet Gynecol*. 1998;178:956-61.
4. Ribeiro CT, Rosa-e-Silva JC, Silva-de-Sá MF, Rosa-e-Silva ACJS, Neto OBP, Reis FJC, et al. Hysteroscopy as a standard procedure for assessing endometrial lesions among postmenopausal women. *São Paulo Med J*. 2007;125:338-42.
5. Dijkhuizen FPHLJ, Brolman HAM, Potters AE, Bongers MY, Heintz APM. The accuracy of transvaginal ultrasonography in the diagnosis of endometrial abnormalities. *Obstet Gynecol*. 1996;87:345-9.
6. Angioni S, Lodo A, Milano F, Piras B, Minerba L, Melis GB. Detection of benign intracavitary lesions in postmenopausal women with abnormal uterine bleeding: a prospective comparative study on outpatient hysteroscopy and blind biopsy. *J Minimally Invasive Gynecol*. 2008;15:87-91.
7. Svirsky R, Smorgick N, Rozowski U, Sagiv R, Feingol M, Halperin R, et al. Can we rely on blind endometrial biopsy for detection of focal intrauterine pathology? *Am J Obstet Gynecol*. 2008;115:1-3.
8. Kremer C., Duffy S., Moroney M. Patient satisfaction with outpatient hysteroscopy versus day case hysteroscopy: randomized, controlled trial. *BMJ*. 2001;320:279-82.
9. Donadio N, Albuquerque Neto LC. Consenso Brasileiro em Videoendoscopia Ginecológica. Rio de Janeiro: Febrasgo; 2001.
10. Goldstein SR, Nachtigall M, Snyder JR, Nachtigall L. Endometrial assessment by vaginal ultrasonography before endometrial sampling in patients with postmenopausal bleeding. *Am J Obstet Gynecol*. 1990;163:119-23.
11. Granberg S, Wikland M, Karlsson B, Norstrom A, Friberg LC. Endometrial thickness as measured by endovaginal ultrasonography for identifying endometrial abnormality. *Am J Obstet Gynecol*. 1991;164:47-52.
12. Smith P, Bakos O, Heimer G, Ulmsten U. Transvaginal ultrasound for identifying endometrial abnormality. *Acta Obstet Gynecol Scand*. 1991;70:591-4.
13. Gumus II, Keskin EA, Kiliç E, Aker A, Kalalr H, Turhan NO. Diagnostic value of hysteroscopy and hysterosonography in endometrial abnormalities in asymptomatic postmenopausal women. *Arch Gynecol Obstet*. 2008;278:241-4.
14. Timmermans A, Gerritse MBE, Opmeer BC, Jansen FW, Mol BWJ, Veersema S. Diagnostic accuracy of endometrial thickness to exclude polyps in women with postmenopausal bleeding. *J Clin Ultrasound*. 2008;36:286-90.
15. Tinelli R, Tinelli FG, Cicinelli E, Malvasi A, Tinelli A. The role of hysteroscopy with eye-directed biopsy in postmenopausal women with uterine bleeding and endometrial atrophy. *Menopause*. 2008;15:737-42.
16. Loverro G, Bettocchi S, Cormio G, Nicolardi V, Greco P, Vimercati A, et al. Transvaginal sonography and hysteroscopy in postmenopausal uterine bleeding. *Maturitas*. 1999;33:139-44.
17. Garuti G, Sambruni I, Cellani F, Garzia D, Alleva P, Luerti M. Hysteroscopy and transvaginal ultrasonography in postmenopausal women with uterine bleeding. *Int J Gynecol Obstet*. 1999;65:25-33.
18. Gimpelson RJ, Rappold RO. A comparative study between panoramic hysteroscopy with directed biopsies and dilatation and curettage. *Am J Obstet Gynecol*. 1988;158:489-92.
19. Cepni I, Ocal P, Erkan S, Saricali FS, Akbas H, Demirkiran F, et al. Comparison of transvaginal sonography, saline infusion sonography and hysteroscopy in the evaluation of uterine cavity pathologies. *Australian New Zealand J Obstet Gynecol*. 2005;45:30-5.
20. Cacciatore B, Ramsay T, Lehtovirta P, Ylostalo P. Transvaginal sonography and hysteroscopy in postmenopausal bleeding. *Acta Obstet Gynecol Scand*. 1994;73:413-6.
21. Machtinger R, Korach J, Padoa A, Fridman E, Zolti M, Segal J, et al. Transvaginal ultrasound and diagnostic hysteroscopy as a predictor of endometrial polyps: risk factors for premalignancy and malignancy. *Int J Gynecol Cancer*. 2005;15:325-8.
22. Clark TJ, Voit D, Gupta JK, Hyde C, Song F, Khan KS. Accuracy of hysteroscopy in the diagnosis of endometrial cancer and hyperplasia. *JAMA*. 2002;288:1616-21.
23. Smith-Bindman R, Kerlikowske K, Feldstein VA, Subak L, Scheidler J, Segal M, et al. Endovaginal ultrasound to exclude endometrial cancer and other endometrial abnormalities. *JAMA*. 1998;280:1510-7.

Artigo recebido: 21/09/08
Aceito para publicação: 28/03/09
