Diagnosis of endometrial pathologies: transvaginal sonography versus hysteroscopy

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ABSTRACT

Background: Abnormal uterine bleeding (AUB) constitutes 69% of all gynecological complaints in the peri- and postmenopausal age groups. The aim of present study was to compare the accuracy of transvaginal sonography and hysteroscopy in diagnosing intracavitary pathologies in women with abnormal uterine bleeding.

Methods: A total of 303 premenopausal women with abnormal uterine bleeding who admitted to the gynecology outpatient clinic of the Istanbul Kanuni Sultan Suleyman Research and Training Hospital, Istanbul, Turkey, between April 2010 and July 2015, and received hysteroscopy, were evaluated retrospectively. The collected data were assembled from the computerised database. All patients underwent pelvic examination, transvaginal ultrasonography, office hysteroscopy and hystopathologic evaluation. Patients with normal appearing uterine cavities on hysteroscopy additionally underwent full curettage. The pathology reports were considered to be the definitive diagnoses of patients. Transvaginal ultrasonography and office hysteroscopy findings were compared with the pathological reports and the sensitivity, specificity, positive and negative predictive values, accuracy values and likelihood ratios of office hysteroscopy and transvaginal ultrasonography were calculated for the detection of endometrial abnormalities.

Results: Endometrial polyps were the most commonly identified pathology with a rate of 77.56%. The sensitivity, specificity, positive and negative predictive values of transvaginal sonography for diagnosing endometrial pathologies were 77%, 32%, 75% and 32%, respectively. The same values for hysteroscopy were 93%, 44%, 88% and 48% respectively. Transvaginal sonography had a sensitivity of 20% with a specificity of 4% for submucous myomas. The sensitivity, specificity, positive and negative predictive values of hysteroscopy for submucous myomas when compared to histopathology were 100% for all.

Conclusions: The diagnostic accuracy of office hysteroscopy for focal lesions such as polyps or submucous myomas is higher than the accuracy of transvaginal ultrasonography. Due to its high diagnostic accuracy, lower complication rate and the ability to obtain direct biopsy specimens while providing simultaneous treatment, we believe that hysteroscopy will retain its place as the gold standard procedure for the investigation of endometrial pathologies.

Keywords: Abnormal uterine bleeding, Hysteroscopy, Transvaginal ultrasonography

INTRODUCTION

Abnormal uterine bleeding (AUB) constitutes 69% of all gynaecological complaints in the peri- and postmenopausal age groups.[1] Approximately 30% of women will experience AUB during their life time.

Although it may be caused by many benign conditions, abnormal uterine bleeding can be a symptom of endometrial cancer in 10% of peri- and postmenopausal abnormal bleeding cases.[2] In 2011, the International Federation of Gynecology and Obstetrics (FIGO) menstrual disorders group (FMDG) published PALM-

COEIN (polyp; adenomyosis; leiomyoma; malignancy and hyperplasia; coagulopathy; ovulatory dysfunction; endometrial; iatrogenic; and not yet classified), a new classification system for abnormal bleeding in the reproductive years.[3] The biggest challenge in the diagnosis of abnormal uterine bleeding is to distinguish patients with dysfunctional disorders who will require medical treatment from patients with organic lesions who will need surgery.

The most commonly used modalities in the evaluation of AUB are endometrial biopsy, dilatation and curettage (D&C), transvaginal ultrasonography (TvUSG), saline infusion sonography and hysteroscopy.[4] In parallel with technological developments TvUSG and office hysteroscopy are the most preferred methods for the diagnosis of abnormal uterine bleeding.

Hysteroscopy is considered to be a highly sensitive method for detecting endometrial pathologies in the current literature. It allows biopsy specimens to be obtained from suspicious endometrial lesions, increasing the rate of correct diagnoses as well as providing treatment during the same session. Due to its high sensitivity rates and no need for subsequent hospitalization, hysteroscopy has begun to take the place of D&C in the diagnosis of abnormal uterine bleeding.

The most common organic causes of abnormal uterine bleeding are endometrial polyps, submucous myomas and endometrial hyperplasias. In the literature incidences of endometrial pathologies that cause AUB differ depending on the selected diagnostic method.

METHODS

In the present retrospective study we evaluated a total of 315 premenopausal patients with AUB admitted to the Istanbul Kanuni Sultan Suleyman Training and Research Hospital, Obstetrics and Gynecology Department and received hysteroscopy, between April 2010-July 2015. 12 patients were excluded from the study because of missing data. All of 303 patients underwent pelvic examination, transvaginal ultrasonography and hysteroscopy. Present study was approved by the Istanbul Medipol University Ethics Committee.

The age distribution, complaints and pathology results were noted. Systemic diseases, previous history of gynecological interventions, drug use and obstetric history were noted. Exclusion criteria were suspicion of pregnancy, presence of active infection, suspicious cervical lesions and abnormal pap test results. All procedures were done with the same instruments but under the supervision of different experts.

TvUSGs were done with general electric voluson 730 expert ultrasound 5-9 MHz vaginal probe. Office hysteroscopies were performed with a Richard Wolf (Germany) hysteroscope with a 2.7 mm to 7 mm diameter telescope. The findings were categorized as normal, polyp, submucous myoma, suspicious lesion or endometrial thickness±endometrial irregularity. Endometrial thickness was defined as endometrium >12mm. Small focal lesions observed during office hysteroscopy were removed with scissors during the procedure. Patients with larger lesions were directed to operative hysteroscopy. Operative hysteroscopies were performed under general anesthesia with a Karl Storz hysteroscope with a 10mm outer diameter and 0-30° angled telescope. Findings were accepted as sufficient and were recorded when the endocervical canal, the entire cavity and both tubal ostiums were observed. The focal lesions detected during operative hysteroscopy were resected, when no lesions were seen full curettage was performed. The exact diagnosis was established with the histological findings.

Histopathological results were classified as normal, polyps, myomas, hyperplasia, polyps+endometrial hyperplasia and other (adenomyosis, endometritis, endocervical polyps, villous structures). The sensitivity and specificity of the hysteroscopy and TvUSG were assessed with final pathology results.

Statistical analysis in this study was performed with the NCSS (Number Cruncher Statistical System) 2007 Statistical Software (Utah, USA) programme. Descriptive statistical methods (mean, standard deviation) as well as sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), the accuracy of the test and the likelihood ratio LR (+) of histopathology results with TvUSG and hysteroscopy were calculated. The p <0.05 level were evaluated as significant.

RESULTS

A total of 315 patients with AUB were examined in the study. 12 patients were excluded from the study because of missing data. 303 patients between the ages of 21 and 51 with AUB and with suspected organic pathology-PALM group- were included into the study. The mean age was 41.42±8.31.

According to TvUSG findings the most commonly diagnosed endometrial pathology was endometrial polyps with an incidence of 77.56% (n = 235). According to the hysteroscopy findings, the most common diagnoses were endometrial polyp, submucous myomas and endometrial thickening±endometrial irregulatory 77.23% (n=234), 9.57% (n=29) and 5.94% (n=18), respectively. In 91.42% of patients, an endometrial pathology was found in the histopathological examination. Endometrial polyps and submucous myomas were the most frequently detected endometrial pathologies with incidences of 74.92% (n=227) and 7.92% (n=24), respectively. Endometrial biopsy, TvUSG and hysteroscopy findings are presented in (Table 1).

Table 1: Distribution of the TvUSG, HS and histopathology results.

	Results	n	%
TvUSG (Transvaginal ultrasonography)	Endometrial thickening±endometrial irregulatory	51	16.83
	Endometrial polyp	235	77.56
	Submucous myoma	13	4.29
	Normal	3	0.99
	Total	303	100.00
Histeroscopy (HS)	Endometrial thickening±endometrial irregulatory	18	5.94
	Endometrial polyp	234	77.23
	Submucous myoma	29	9.57
	Normal	21	6.93
	Suspicious lesion	1	0.33
	Total	303	100.00
Histopathology result	Endometrial hyperplasia	8	2.64
	Endometrial polyp	227	74.92
	Submucous myoma	24	7.92
	Normal	26	8.58
	Other	12	3.96
	Endometrial polyp + endometrial hyperplasia	6	1.98
	Total	303	100.00

In present study, TvUSG's sensitivity in detecting endometrial pathology was 77%, specificity 32%, PPV 75% and NPV 32% when compared with histopathologic results. The accuracy and Likelihood Ratio (LR) of TvUSG were 72% and 0.83, respectively (Table 2 and 3).

Table 2: Sensitivity, Specificity, PPV, NPV, Accuracy and LR of TvUSG for endometrial pathologies.

TvUSG	Sensitivity	Specificity	PPV	NPV	Accuracy	LR (+)
Endometrial thickening± endometrial irregulatory	1.00	0.05	0.09	1.00	0.13	1.05
Endometrial polyp	0.84	0.05	0.90	0.03	0.77	0.88
Submucous myoma	0.20	0.04	0.08	0.11	0.09	0.21
TvUSG	0.77	0.32	0.75	0.32	0.72	0.83

Table 3: Distribution of TvUSG results according to the histopathology results.

		Histopathology result										
		Endometrial hyperplasia		Endometrial polyp		Submucous myoma		Normal		other		Endometrial polyp + endometrial hyperplasia
TvUSG	Endometrial thickening± endometrial irregulatory	2	25.00%	36	15.93%	8	33.33%	4	15.38%	1	9.09%	0	0.00%
	Endometrial Polyp	6	75.00%	185	81.86%	9	37.50%	20	76.92%	8	72.73%	6	100.00%
	Submucous Myoma	0	0.00%	4	1.77%	7	29.17%	1	3.85%	1	9.09%	0	0.00%
	Normal	0	0.00%	1	0.44%	0	0.00%	1	3.85%	1	9.09%	0	0.00%

Compared with results of histopathological findings hysteroscopy's sensitivity was 93%, specificity 44%, PPV 88% and NPV 48% in the determination of all endometrial pathologies. Accuracy and LR values of hysteroscopy in detecting all endometrial pathologies were 83% and 1.23, respectively (Table 4 and 5).

Table 4: Sensitivity, Specificity, PPV, NPV, Accuracy and LR of HS for endometrial pathologies.

HS	Sensitivity	Specificity	PPV	NPV	Accuracy	LR (+)
Endometrial thickening± endometrial irregularity	1.00	0.67	0.29	1.00	0.71	3.00
Endometrial Polyp	0.96	0.69	0.98	0.55	0.94	3.06
Submucous Myoma	1.00	1.00	1.00	1.00	1.00	-
HS	0.93	0.44	0.88	0.48	0.83	1.23

Table 5: Distribution of HS results according to the histopathology results.

		Histopathology result											
		Endometrial hyperplasia		Endometrial polyp		Submucous myoma		Normal		Other		Endometrial polyp + endometrial hyperplasia	
HS	Endometrial thickening± endometrial irregularity	2	25.00%	10	4.41%	0	0.00%	5	19.23%	1	9.09%	0	0.00%
	Endometrial polyp	6	75.00%	198	87.22%	6	25.00%	11	42.31%	6	54.55%	6	100.00%
	Submucous myoma	0	0.00%	9	3.96%	18	75.00%	0	0.00%	2	18.18%	0	0.00%
	Normal	0	0.00%	9	3.96%	0	0.00%	10	38.46%	2	18.18%	0	0.00%
	Suspicious lesion	0	0.00%	1	0.44%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

In present study TvUSG's sensitivity of diagnosing submucous myomas was found 20% and specificity was 4% compared with endometrial biopsy diagnosis. TvUSG's PPV for submucosal myomas was 8%, NPV was 11%, accuracy was 9% and LR was 0.21. TVUSG's sensitivity for diagnosis of endometrial polyps was 84%, specificity was 5%, PPV was 90%, NPV was found to be 3% compared with endometrial biopsy. Diagnostic accuracy was 77% and LR (+) was calculated as 0.88.

Hysteroscopy's sensitivity in the diagnosis of endometrial polyps was 96%, specificity was 69%, PPV was 98%, NPV was calculated as 55% compared with endometrial biopsy. Hysteroscopy's accuracy in detecting endometrial polyps and LR values were 94% and 3.06, respectively. In present study, hysteroscopy's sensitivity was 100%, specificity was 100%, PPV was 100% and NPV was 100% for submucous myomas.

DISCUSSION

Endometrial polyps and submucous myomas are the most common organic lesions that cause abnormal uterine bleeding. TvUSG, D&C and hysteroscopy are used for the diagnosis of the underlying pathology in patients with this condition. In this study we examined the diagnostic accuracy of TvUSG and hysteroscopy for uterine lesions. In a meta-analysis examining 19 prospective studies, TVUSG's sensitivity was found to be between 46% and 100%, and its specificity between 12% and 100% when compared with histopathological results obtained after hysteroscopy or hysterectomy.[5] De Vries et al reported TVUSG's sensitivity and specificity as 60% and 93%, respectively.[6] Goyal et al found that TVUSG had high sensitivity (95%), specificity (94%), PPV (93%), and NPV (96%) in detecting endometrial pathologies.[7] In present study TVUSG's sensitivity, specificity, PPV and NPV for detecting endometrial pathologies were 77%, 32%, 75% and 32%, respectively. Although the sensitivity, PPV and NPV were similar to previous reports, the specificity of TVUSG in detecting endometrial pathologies was lower than those reported in the literature. We found hysteroscopy's sensitivity as 93%, specificity 44%, PPV 88% and NPV as 48% in detecting all endometrial pathologies, in consistence with the literature. Widrich et al found hysteroscopy's sensitivity as 97%, specificity 93%, PPV 94% and NPV as 97% for all endometrial pathologies, which is higher than present results.[8] Garuti et al reported hysteroscopy's sensitivity to be 96.5%, specificity 93.6%, and PPV 92.9%.[9] D Vitner et al found hysteroscopy's sensitivity and specificity to be 92% and 67.7%, respectively and TVUSG's sensitivity and specificity to be 44.8% and 81.8%, respectively, for endometrial polyps.[10] This is in line with the findings of present study. Several studies have compared the diagnostic values of TVUSG and hysteroscopy for the diagnosis of uterine pathologies. Veena BT et al study showed TvUSG had a low

sensitivity, but 100% specificity, and a diagnostic accuracy of 88.3% for endometrial polyps.[11]

In present study TVUSG's sensitivity was 20% and specificity was 4% in detecting submucous myomas. These results are lower than the values reported in the literature. De Varies et al found TVUSG's sensitivity for submucous myomas to be 64% and specificity 90%.[6] In a study published in 2013, D Vitner et al found TVUSG's sensitivity as 85.7% and specificity as 73.9% for submucous myomas.[10] In present study TVUSG's sensitivity and specificity were lower for submucosal myomas than endometrial polyps.

In the present study group hysteroscopy's sensitivity for detecting endometrial polyps was 96%, specificity was 69%, PPV was 98% and NPV was 55% compared to the endometrial biopsy results. Birinyi et al found hysteroscopy's sensitivity 87%, specificity 89%, PPV 66% and NPV 96%.[12] Vercellini et al found hyteroscopy's sensitivity 86%, specificity 94%, PPV 91% and NPV 90% for endometrial polyps.[13] Garuti et al reported hysteroscopy's sensitivity, specificity, PPV and NPV; 95.3%, 95.4%, 98.9% and 81.7%, respectively, in detecting endometrial polyps.[9] Hysteroscopy identifies endometrial polyps effectively.

In present study hysteroscopy's sensitivity was 100%, specificity was 100%, PPV was 100% and NPV was 100% for submucous myomas. In a recently published meta-analysis hysteroscopy's sensitivity was reported to be 97% and specificity 98.9% for submucous myomas.[14] Widrich et al found hysteroscopy's sensitivity to be 100%, specificity 96%, PPV 87% and NPV 100% for submucous myomas.[8] Vercellini et al reported hysteroscopy's sensitivity 95%, specificity 81%, PPV 85% and NPV 93% for submucous myomas.[13]

Transvaginal ultrasonography's relative simplicity and availability makes it a very helpful tool for screening, but its relatively modest diagnostic value for most of the uterine pathologies makes interpretation of the findings rather challenging for the physician. Two patients (0.6%) who were reported to have normal findings on TvUSG were found to have an organic lesion upon histopathologic examination and 25 patients (8.3%) who appeared to have an organic lesion on TvUSG had normal histopathological results. 11 patients (3.6%) who were reported to be normal by hysteroscopy were found to have an organic lesion upon histopathological examination and 16 patients (5.3%) who were reported to have an organic lesion by hysteroscopy had normal histopathology results.

CONCLUSION

As a result in present study, hysteroscopy remains the best option for the assessment of the endometrium due to its established accuracy in diagnosis when compared to ultrasonographic imaging modalities. It allows direct visualization of the cavity and sampling for histopathological examination. We have demonstrated that hysteroscopy is the gold standard for detection of endometrial pathologies, but not all pathologies can be detected by hysteroscopy and D&C should be performed if an organic lesion is suspected.

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