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Comparison between ultrasound and hysteroscopy in the diagnosis of intra-uterine space-occupying lesion in Tikrit teaching hospital

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Abstract

This study evaluates the diagnostic accuracy of two-dimensional transvaginal ultrasound and hysteroscopy in reducing diagnosis of intrauterine lesions.

A cross-sectional study at Tikrit Teaching Hospital surveyed 50 women with abnormal uterine bleeding or suspected findings on ultrasonography, including those diagnosed with submucous myoma, endometrial polyps, residual placenta, infertility, recurrent pregnancy loss, and over 16 years old. The exclusion criteria for this statement include the possibility of pregnancy and the presence of pelvic inflammatory disease.

Data was collected from women through direct interviews, examining demographics, obstetric history, ultrasound findings, and hysteroscope results. Abnormal findings were resected, and curettage was performed for abnormal uterine bleeding or suspected intrauterine findings.

The mean age among cases was 43 ± 12 years. The main complain of then patient were Menorrhagia 17 (34%), intermenstrual bleeding 15 (30%), postmenopausal bleeding 10 (20%), and infertility 8 (16%). The histopathological findings was uterine polyp in 22 (44%), uterine fibroid 4 (8%), Endometrial atrophy 4 (8%), proliferative endometritis 4 (8%), Endometrial hyperplasia 4 (8%), secretory endometritis 2 (4%), others (septet uterus, atypia, endometritis) 6 (12%), and no abnormal finding in 5 (10%). The ultrasound had sensitivity of (84.4%), specificity (80%), false positive (20%), false negative (15.6%), accuracy (84%), positive predictive value (97%), negative predictive value (36.4%). The hysteroscopy had sensitivity (95.6%), specificity (83%), false positive (17%), false negative (4.4%), accuracy (94%), positive predictive value (98%), negative predictive value (71.4%).

Transvaginal ultrasonography is a non-invasive, effective first-line investigation for women with vaginal bleeding or suspected endometrial pathology, while hysteroscopy, although sensitive and specific, requires an operating room, anesthesia, and had increasing risk and cost.

Keywords: Ultrasound, hysteroscopy, intra-uterine space-occupying lesion, Tikrit, fibroid, polyp

Introduction

Among the range of gynecological diseases, the pathology of the endo- and myometrium ranks high. It can occur as inflammatory and immunopathological conditions, hyperplastic and tumor processes, including leiomyoma, and mullerian developmental abnormalities. This pathology is manifested clinically by disorders of the menstrual and reproductive functions^[1]. The imaging approaches with transabdominal / transvaginal ultrasound (US) and hysteroscopic examinations as well as histological examination of the resected endometrium taken by biopsy are used to assess intrauterine pathology^[2].

The methods available for evaluation of the uterine cavity have developed considerably over the last few years. Transvaginal sonography is considered a simple examination with good accuracy for most uterine cavity abnormalities^[3, 4]. The uterus and its pathologic lesions can be visualized clearly but there are conflicting reports about its diagnostic accuracy^[5].

Hysteroscopy was one of the very earliest approaches to the direct study of the uterine cavity. Hence, it is rather ironic that advances in hysteroscopy had to wait for technical innovations in other endoscopic fields before the technique became feasible in routine clinical practice. A number of specific problems impeded the scientific progress in the field of hysteroscopy for several decades. Not the least of these were the difficulty in distending the uterine cavity, the friable nature of the uterine mucosa, and the frequent need for dilatation of the cervical canal making the use of anesthesia mandatory^[3, 4].

Hysteroscopy has the advantage of providing a direct visualization of the uterine cavity and the endometrium, allowing biopsy to be taken during the procedure from suspected abnormalities [3-5]. This technique has become the standard of choice for evaluating the uterine cavity, but it is an invasive procedure, performed under local or general anesthesia, and associated with discomfort [6].

This study aimed to evaluate the diagnostic accuracy of TVS and hysteroscopy in order to examine if the number of hysteroscopic procedures can be reduced in a Tikrit Teaching Hospital

Material

A cross sectional study in Tikrit Teaching Hospital in a time period from October 1, 2023 till the end of June 2024. Randomly selected 50 women with abnormal uterine bleeding or a suspected finding on ultrasonography performed by the radiologist. Inclusion Criteria include: Patients were diagnosed with submucous myoma or endometrial polyps or residual placenta by ultrasound, Women with abnormal uterine bleeding, infertility, recurrent pregnancy loss, Patients aged over 16 years old. Exclusion Criteria include: The possible pregnancy, The presence of pelvic inflammatory disease. Data collected by direct interview with the women, taking information about demographic variables, obstetrical history, ultrasound finding and hystrosopic findings. Transvaginal ultrasound was performed at the ultrasound unit of the Department of Obstetrics and Gynecology prior to hysteroscopy. Hysteroscopy was performed after ultrasound preformation.

Electrosurgical resection of abnormal findings was performed and specimens will obtained and sent for histopathological examination. Curettage performed in all patients with abnormal uterine bleeding or suspected intrauterine findings regardless of the results of the diagnostic hysteroscopy.

At the beginning of the interview, verbal informed consent was obtained individually from all participants after clearly explaining the purpose of the study and the type of data required, and respondents were assured of data confidentiality and privacy. Questionnaire forms were checked at the end of the interview to avoid missing data. SPSS Software version 25.0 was used to perform statistical analysis for this study. The data were presented as numbers and percentages.

Comparison of study groups was carried out using chi-square test for categorical data. P-value of < 0.05 was considered statistically significant.

Results

The mean age among cases was 43 ± 12 the minimum age was 26 the maximum was 72 years. Most of the cases had secondary school education 17 (34%), followed by read and write 14 (28%), and college 14 (28%). Most of the cases were housewife 25 (50%) followed by employer 20 (40%), and retired 5 (10%). Diabetes mellitus found among 4 (8%) of the sample, hypertension found among 9 (18%), non of the sample had positive history of smoking. Age at menarche was < 12 years among 14 (28%), and > 12 years was 15 (30%), as shown in (Table 1).

Table 1: The general characteristics of study sample

General characteristics	Frequency	Percent
Age mean	43±12	
Education		
Read and Write	14	28.0
1ry school	5	10.0
2ndry school	17	34.0
college	14	28.0
Job		
Housewife	25	50.0
Employer	20	40.0
retired	5	10.0
DM		
Yes	4	8.0
No	46	92.0
HT		
Yes	9	18.0
No	41	82.0
Smoking		
No	50	100.0
Age at menarche		
<12	14	28.0
12 years	21	42.0
> 12 years	15	30.0
Total	50	100.0

Nuliparity found among 10 (20%) of the sample, followed by para 1 2 (4%), and multipara 38 (76%). Vaginal examination 990 on was positive among 6 (12%). The main

complain of then patient were Menorrhagia 17 (34%), intermenstrual bleeding 15 (30%), postmenopausal bleeding 10 (20%), and infertility 8 (16%), as shown in (Table 2).

Table 2: The obstetrical and vaginal examination findings and main complain of study sample

Parity	Nullipara	Frequency	Percent
	Para 1	10	20.0
		2	4.0

	Multipara	38	76.0
Vaginal Examination Findings	Positive	6	12.0
	Negative	44	88.0
Main Complain	Menorrhagia	17	34.0
	Intermenstrual Bleeding	15	30.0
	Post-Menopausal Bleeding	10	20.0
	Infertility	8	16.0
	Total	50	100.0

The histopathological findings was uterine polyp in 22 (44%), followed by uterin fibroid 4 (8%), Endometrial atrophy 4 (8%), proliferative endometritis 4 (8%),

Endometrial hyper plasia 4 (8%), secretory endometritis 2 (4%), others (septte uterus, atypia, endometritis) 6 (12%), and no abnormal finding in 5 (10%), as shown in (Table 3).

Table 3: The histopathological findings of the study samples

	No.	%
Uterin Polyp	22	44
Uterin Fibroid	4	8
Endometrial Atrophy	4	8
Proliferative Endometritis	4	8
Endometrial Hyperplasia	3	6
Secretory Endometritis	2	4
Others	6	12
negative	5	10
Total	50	100

The ultrasonography diagnosed uterine polyp in 17 (34%), followed by uterine fibroid 5 (10%), Endometrial thickening 14 (28%), Endometrial atrophy 3 (6%), others 7 (14%), and no abnormal finding in 4 (8%).

The hysteroscopy diagnosed uterine polyp in 23 (46%), followed by uterine fibroid 4 (8%), Endometrial thickening 7 (14%), Endometrial atrophy 5 (10%), others 6 (12%), and no abnormal finding in 5 (10%). As shown in tale (Table 4).

Table 4: The ultrasound and hysteroscopy findings and histopathological findings of the study samples

	TVU		Hysteroscopy		Histopathology	
	No	%	No	%	No	%
Polyp	17	34	23	46	22	44
Fibroid	5	10	4	8	4	8
Endometrial Thickening	14	28	7	14	9	18
Endometrial Atrophy	3	6	5	10	4	8
Others	7	14	6	12	6	12
Negative	4	8	5	10	5	10
	50	100	50	100	50	100

The ultrasound as diagnostic method for total pathology had sensitivity (84.4%), specificity (80%), false positive (20%), false negative (15.6%), accuracy (84%), positive predictive value (97%), negative predictive value (36.4%).

The hysteroscopy as diagnostic method for total pathology had sensitivity (95.6%), specificity (83%), false positive (17%), false negative (4.4%), accuracy (94%), positive predictive value (98%), and negative predictive value (71.4%). As shown in table (Table 5).

Table 5: The ultrasound and hysteroscopy sensitivity specificity and accuracy regarding all pathology

	Sensitivity	Specificity	False Positive	False Negative	Accuracy	PPV	NPV
TVU	84.4	80	20	15.6	84	97	36.4
Hysteroscopy	95.6	83	17	4.4	94	98	71.4

The ultrasound as diagnostic method for uterine fibroid had sensitivity (80%), specificity (80%), false positive (20%), false negative (20%), accuracy (80%), positive predictive value (80%), negative predictive value (80%). The hysteroscopy as diagnostic method for uterine fibroid had sensitivity (100%), specificity (100%),false positive (0%), false negative (0%), accuracy (100%), positive predictive value (100%), negative predictive value (100%).

The ultrasound as diagnostic method for Uterine Polyp had sensitivity (77.3%), specificity (100%), false positive (0%), false negative (22.7%), accuracy (81%), positive predictive value (100%), and negative predictive value (44.4%). The hysteroscopy as diagnostic method for Uterine Polyp had

sensitivity (100%), specificity (80%), false positive (20%), false negative (0%), accuracy (96%), positive predictive value (96%), negative predictive value (100%).

The ultrasound as diagnostic method for Endometrial Atrophy had sensitivity (75%), specificity (100%), false positive (0%), false negative (25%), accuracy (88%), positive predictive value (100%), negative predictive value (80%). The hysteroscopy as diagnostic method for Endometrial Atrophy had sensitivity (80%), specificity (80%), false positive (20%), false negative (20%), accuracy (80%), positive predictive value (80%), and negative predictive value (80%).

The ultrasound as diagnostic method for Thick Endometrium had sensitivity (88.9%), specificity (40%), false positive (60%), false negative (11.1%), accuracy (63%), positive predictive value (57%), and negative predictive value (80%). The hysteroscopy as diagnostic

method for Thick Endometrium had sensitivity (77.8%), specificity (100%), false positive (0%), false negative (22.2%), accuracy (85%), positive predictive value (100%), negative predictive value (66.7%). As shown in (Table 6).

Table 6: The ultrasound and hystoscopic sensitivity specificity and accuracy regarding each utrine pathology

	Sensitivity	Specificity	False Positive	False Negative	Accuracy	PPV	NPV
Uterin Fibroid							
TVU	80	80	20	20	80	80	80
Hysteroscopy	100	100	0	0	100	100	100
Uterine Polyp							
TVU	77.3	100	0	22.7	81	100	44.4
Hysteroscopy	100	80	20	0	96	96	100
Endometrial Atrophy							
TVU	75	100	0	25	88	100	80
Hysteroscopy	80	80	20	20	80	80	80
Thick Endometrium							
TVU	88.9	40	60	11.1	63	57	80
Hysteroscopy	77.8	100	0	22.2	85	100	66.7

Discussion

Intrauterine ultrasound and angiography are the clinical imaging diagnostic methods developed in recent years with extraordinary clinical significance for the diagnosis and treatment of space-occupying abnormalities in the uterine cavity, especially for the pretreatment evaluation of hysteroscopy surgery. Abnormal uterine bleeding and infertility cannot be accurately judged based on history, gynecological examination, and b-ultrasound examination alone [7].

The mean age among cases was 43±12 the minimum age was 26 the maximum was 72 years. This goes with Ahmed MT *et al.* [8] in 2022 found that the mean age was 43.5+6.12. This goes with Sulima AN *et al.* [9] in 2020 found that the average age of women was 36.30 ± 1.04 years.

Nuliparity found among 10 (20%) of the sample, followed by para 1 2 (4%), and multipara 38 (76%). This goes with Ahmed MT *et al.* [8] in 2022 found that the mean parity was 3.43+2.81

The main complain of then patient were Menorrhagia 17 (34%), intermenstrual bleeding 15 (30%), postmenopausal bleeding 10 (20%), and infertility 8 (16%). This goes with Das S *et al.* [10] in 2021 found the Menorrhagia 50 (33.3%) was the most frequent indications for hysteroscopy. (14%), (22.7%), (10%) and (13.3%) of women were presenting complaints of metrorrhagia, menometrorrhagia, polymenorrhea and irregular spotting respectively.

The histopathological findings was uterine polyp in 22 (44%), Mani P, *et al.* [11] found that endometrial polyp found among 32.84%. while Xia Z *et al.* [12] in 2022 Found that polyp diagnosed among (90.9%).of the patients.

Uterine fibroid in current study was 4 (8%), this goes with Mani P, *et al.* [11] found that Submucosal myoma found among 2.94%. while Xia Z *et al.* [12] in 2022 Found that fibroid diagnosed among (81.8%).of the patients.

Results indicate that endometrial hyperplasia fund among 4 (8%), this goes with Sulima AN *et al.* [9] in 2020 found that endometrial hyperplasia without atypia was recorded in 45.7% of patients. Mani P, *et al.* [11] found that endometrial hyperplasia found among 6.37% of thepatients.

In current study Endometrial atrophy found among 4 (8%), this goes with Sulima AN *et al.* [9] in 2020 found that endometrium with hypoplastic signs was diagnosed in

11.4% of patients. Mani P, *et al.* [11] found that endometrial atrophy found among 10.24% of the patients.

The ultrasound as diagnostic method for total pathology had sensitivity (84.4%), specificity (80%), false positive (20%), false negative (15.6%), accuracy (84%), positive predictive value (97%), negative predictive value (36.4%). The hysteroscopy as diagnostic method for total pathology had sensitivity (95.6%), specificity (83%), false positive (17%), false negative (4.4%), accuracy (94%), positive predictive value (98%), negative predictive value (71.4%).

This goes with Das S *et al.* [10] in 2021 found the sensitivity, specificity, positive predictive value and negative predictive value were 96%, 53.8%, 90.9% and 77.8% respectively for detecting overall abnormal pathology by hysteroscopy in comparison to histopathology.

The ultrasound as diagnostic method for uterine fibroid had sensitivity (80%), specificity (80%), false positive (20%), false negative (20%), accuracy (80%), positive predictive value (80%), negative predictive value (80%). The hysteroscopy as diagnostic method for uterine fibroid had sensitivity (100%), specificity (100%),false positive (0%), false negative (0%), accuracy (100%), positive predictive value (100%), negative predictive value (100%).

This goes with Xia Z *et al.* [12] in 2022 found that hysteroscopy is better than the ultrasound in diagnosing uterine fibroid, the diagnostic sensitivity, specificity, accuracy, positive predictive value, and negative predictive value were 88.9%, 50.0%, 81.8%, 88.9%, and 50.0%, respectively. While the hysteroscop with diagnostic sensitivity of 96.3%, specificity of 83.3%, accuracy of 93.9%, positive predictive value of 96.3%, and negative predictive value of 83.3%.

The ultrasound as diagnostic method for Uterine Polyp had sensitivity (77.3%), specificity (100%), false positive (0%), false negative (22.7%), accuracy (81%), positive predictive value (100%), negative predictive value (44.4%). The hysteroscopy as diagnostic method for Uterine Polyp had sensitivity (100%), specificity (80%), false positive (20%), false negative (0%), accuracy (96%), positive predictive value (96%), negative predictive value (100%).

This goes with Xia Z *et al.* [12] in 2022 Found that the vaginal ultrasound in diagnosing uterine polyp the diagnostic sensitivity, specificity, accuracy, positive predictive value, and negative predictive value were 90.0%,

66.7%, 87.9%, 96.4%, respectively and the hysteroscopy with diagnostic sensitivity of 96.7%, specificity of 66.7%, accuracy of 93.9%, positive predictive value of 96.7%, and negative predictive value of 66.7%.

Vasudeva S *et al.* [13] For diagnosis of fibroid and polyp, TVS had sensitivity of 77.78% and specificity of 100% and with hysteroscopy both sensitivity and specificity were 100%

The ultrasound as diagnostic method for Endometrial Atrophy had sensitivity (75%), specificity (100%), false positive (0%), false negative (25%), accuracy (88%), positive predictive value (100%), negative predictive value (80%). The hysteroscopy as diagnostic method for Endometrial Atrophy had sensitivity (80%), specificity (80%), false positive (20%), false negative (20%), accuracy (80%), positive predictive value (80%), negative predictive value (80%). This goes with Vasudeva S *et al.* [13] found that TVS had 100% sensitivity in diagnosing the atrophic endometrium, but the specificity was 67.5%. Sensitivity with hysteroscopy was also 100% for atrophic endometrium, however specificity was increased with hysteroscopy to 86.49%.

The ultrasound as diagnostic method for Thick Endometrium had sensitivity (88.9%), specificity (40%), false positive (60%), false negative (11.1%), accuracy (63%), positive predictive value (57%), negative predictive value (80%). The hysteroscopy as diagnostic method for Thick Endometrium had sensitivity (77.8%), specificity (100%), false positive (0%), false negative (22.2%), accuracy (85%), positive predictive value (100%), negative predictive value (66.7%). Chowdary P *et al.* [13] in 2019 found that the cut-off value for endometrial thickness of 8 mm, using TVS had a fair accuracy, had a sensitivity of 100% and a specificity of 24.3%.

Conclusion

Transvaginal ultrasonography is relatively effective, easy, non-invasive and needs no anesthesia and hence should be considered as first line investigation in the evaluation of women with vaginal bleeding, or suspected endometrial pathology.

Although hysteroscopy is very sensitive and specific, it generally requires an operating room setting and local or general anesthesia. These requirements increase the risk and cost, therefore, the use of hysteroscopy can be diminished and used for making the accurate diagnosis and not only for surgical purposes.

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