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Corresponding Author
K. Chandrashekar,
Department of OBG, VIMS, Ballari, Karnataka, India

Author Designation
[1]Senior Consultant
[2]Assistant Professor
[3]Professor
[4]Associate Professor

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The Diagnostic Efficacy of Transvaginal Ultrasonography and Hysteroscopy in Detecting Uterine Abnormalities in Abnormal Uterine Bleeding

[1]B.N. Rajesh, [2]M.H. Chandana, [3]B. Vijaylakshmi, [4]K. Chandrashekar
[1]MCH, Koppala, Karnataka, India
[2]Department of Anesthesia, VIMS, Ballari, Karnataka, India
[3,4]Department of OBG, VIMS, Ballari, Karnataka, India

Abstract
Hysteroscopy has emerged as a useful diagnostic procedure that is safe, with a low incidence of clinically significant complications. The accuracy of diagnosis based on hysteroscopic visualization is high for endometrial cancer, but only moderate for other endometrial diseases. All the eligible patients were subjected to transvaginal sonography, Hysteroscopy, Hysteroscopic guided biopsy and biopsy specimen were placed in formalin 10% and sent for histopathological correlation. Final diagnosis was the diagnosis applied after the histopathological result was received. Histopathological report of the study population revealed chronic cervicitis in 47.1%, Endocervicitis in 4.7%, proliferative phase in 57.6%, disordered proliferative endometrium in 2.4%, Endometrial polyp in 28.2%, Secretory endometrium with chronic cervicitis 10.6% and Simple hyperplasia without atypia in 22.4%.

INTRODUCTION

AUB is a common gynecological complaint, and it may involve females at any age group. 33% of women referred to gynecology clinics have AUB and the figure rises to 69% in premenopausal and postmenopausal women. Abnormal uterine bleeding accounts for two thirds of all hysterectomies. During the last decades, several methods including transvaginal ultrasonography, saline infusion sonography and hysteroscopy, have been developed to assess uterine cavity, with their own advantages and disadvantages[1]. Although TVS is a simple examination allowing clear visualization of most uterine conditions, several concerns have been raised regarding its accuracy. Hysteroscopy on the other hand, allows direct visualization and sampling of the uterine cavity and has an established diagnostic value for many uterine conditions. However, the latter modality is not as cost-effective and convenient as ultra-sonographic imaging modalities, which are associated with relatively less patient discomfort and do not necessitate anesthesia[2]. Invasive nature of Hysteroscopy and high cost preclude its use as a primary diagnostic procedure in patients with AUB. Thus, currently available modalities are far from being perfect. Ability of TVS for screening the lesions within the endometrial cavity is limited. The finding of a thickened central endometrial complex seen on TVS is often non-specific and may be caused by an endometrial polyp, submucosal fibroids, endometrial hyperplasia, carcinoma, or cystic atrophy. Focal lesions are under diagnosed at TVS because of limitations of the double-layer thickness evaluation[3].

Hysteroscopy has emerged as a useful diagnostic procedure that is safe, with a low incidence of clinically significant complications. The accuracy of diagnosis based on hysteroscopic visualization is high for endometrial cancer, but only moderate for other endometrial diseases. Hysteroscopy is an operator-dependent technique and its sensitivity is therefore not as optimal as that of a histological examination. Office hysteroscopy has the advantage of directly visualizing the uterine cavity and endometrium, but it cannot comment on myometrial pathology[4].

Hence the present study was carried out with the objective to Evaluate causes of abnormal uterine bleeding in perimenopausal women using transvaginal sonography and hysteroscopy and to compare the diagnostic efficacy of transvaginal ultrasonography and hysteroscopy in detecting uterine abnormalities in abnormal uterine bleeding by correlating the results with histopathological examination.

MATERIALS AND METHODS

Study setting: Department of OBG.

Study population: Perimenopausal women presented with AUB.

Study Design: Prospective Observational study.

Sample Size: 85.

Sampling Technique: Simple Random sampling method.

Inclusion Criteria:

- Age 40-55 yrs attending to OPD with c/o AUB
- Uterus size <12 wks
- Cases of AUB

Exclusion Criteria:

- Uterus >12 wks
- Vaginal and cervical causes of bleeding.
- Coagulopathy
- Patients with history of hormonal drug s and anticoagulants and other drugs causing abnormal bleeding
- Acute active bleeding
- Women on HRT
- Acute pelvic infection

After selecting the patients who fulfill the eligibility criteria by clinical history, obstetrical and gynecological history taken and detail clinical examination and Per speculum examination was performed to note any abnormal discharge, erosion, cervical hypertrophy or cervical polyp and vaginal examination done to know uterine, cervical and adnexal pathology. Laboratory investigations including CBC, coagulation profile, random blood sugar, liver and kidney function and pregnancy test done. Informed consent was taken for all the patients, subjected to the study. All the eligible patients were subjected to transvaginal sonography, Hysteroscopy, Hysteroscopic guided biopsy under IV Sedation by Anesthetist and biopsy specimen were placed in formalin 10% and sent for histopathological correlation. Final diagnosis was the diagnosis applied after the histopathological result was received. Histopathological reports of endometrial pattern as well as that of the hysterectomy specimens were correlated with ultra-sonographic and hysteroscopy findings and the sensitivity and specificity of each test were calculated.

RESULTS AND DISCUSSIONS

Transvaginal sonography revealed findings of cervix as hypertrophied cervix in 43.6%.

Transvaginal sonography revealed findings of endometrium as endometrial hyperplasia in 18.8%, polyps in 21.2% and submucous fibroids in 8.2%.

Transvaginal sonography revealed findings of uterus as adenomyosis in 5.9%, ant wall intramural fibroid in 2.4%, intramural fibroid in 9.4%.

Transvaginal sonography revealed findings of uterine hypertrophy in 72.9%.

Hysteroscopic findings revealed proliferative endometrium in 46.2%, polyps in 25.9%, atrophic 2.4%, submucosal fibroid 14.1%, cervical polyps in 25.9%, secretory in 14.1% and hyper plastic in 42.4%.

Histopathological report of the study population revealed chronic cervicitis in 47.1%, Endocervicitis in 4.7%, proliferative phase in 57.6%, disordered proliferative endometrium in 2.4%, Endometrial polyp in 28.2%, Secretory endometrium with chronic cervicitis 10.6% and Simple hyperplasia without atypia in 22.4%.

Sensitivity,specificity,PPVandNPVofTVSfordiagnosing proliferative endometrium was 62%, 78.6%, 82.6% and 56.3% respectively.

Sensitivity, specificity, PPV and NPV of TVS for diagnosing secretory endometrium was 64.2%, 85.3%, 46.2% and 92.6% respectively.

Sensitivity, specificity, PPV and NPV of TVS for diagnosing hyperplastic endometrium was 44.3%, 96.3%, 74.5% and 88% respectively.

Sensitivity, specificity, PPV and NPV of TVS for diagnosing polyp was 51.2%, 90.2%, 11.2% and 98.7% respectively.

Sensitivity, specificity, PPV and NPV of hysteroscopy for diagnosing proliferative endometrium was 74.5%, 82.6%, 83% and 74.6% respectively.

Sensitivity,specificity,PPVandNPVofhysteroscopyfordiagnosingsecretory endometrium was 84.6%, 86.3%, 51% and 98.6% respectively.

Sensitivity, specificity, PPV and NPV of hysteroscopy for diagnosing hyperplastic endometrium was 55.2%, 95.78%, 77.5% and 91.3% respectively.

Sensitivity, specificity, PPV and NPV of hysteroscopy for diagnosing polyp was 71.6%, 99.6%, 99.5% and 95.6% respectively.

For diagnosing proliferative endometrium, agreement between TVS and HPR was found in 27 patients, between hysteroscope and HPR was found in 27 patients, between all the three methods was found in 20 patients.

For diagnosing secretory endometrium, agreement between TVS and HPR was found in 5 patients, between hysteroscope and HPR was found in 4 patients, between all the three methods was found in 4 patients.

For diagnosing hyperplastic endometrium, agreement between TVS and HPR was found in 3 patients, between hysteroscope and HPR was found in 3 patients, between all the three methods was found in 2 patients.

For diagnosing polyps, agreement between TVS and HPR was found in 1 patient, between hysteroscope and HPR was found in 9 patients, between all the three methods was found in 1 patients.

In our study, Transvaginal sonography revealed findings of endometrium as endometrial hyperplasia in 18.8%, polyps in 21.2% and submucous fibroids in 8.2%. Transvaginal sonography revealed findings of uterine hypertrophy in 72.9%. Transvaginal sonography revealed findings of uterus as adenomyosis in 5.9%, ant wall intramural fibroid in 2.4%, intramural fibroid in 9.4%. Transvaginal sonography revealed findings of cervix as hypertrophied cervix in 43.6%.

Edwin[5] reported that the most commonly detected pathology was endometrial hyperplasia (17.8%), followed by uterine myoma (15.5%), on ultrasound. Endometrial polyp was diagnosed in 4 (4.4%) cases while carcinoma of endometrium was suspected in one (1.1%) case.

Barman[6] reported myohyperplasia 6 (7.06%), Adenomyosis 3 (3.53%) and Fibroid 18 (21.18%).

B Yildizhan[7] in 2008 shows the sensitivity and specificity of TVS in detecting endometrial polyps were 65.2% and 87.9%, respectively and in detecting uterine fibroids were 95.8% and 95.0%, respectively as compared with sonohysterography.

In our study, Hysteroscopic findings revealed proliferative endometrium in 46.2%, polyps in 25.9%, atrophic 2.4%, submucosal fibroid 14.1%, cervical polyps in 25.9%, secretory in 14.1% and hyperplastic in 42.4%.

Only 5 patients were found to be malignant changes i.e. 5.9%.

Edwin[5] reported that thirty-four cases had proliferative endometrium on histopathology and in 33 cases, proliferative endometrium was found on hysteroscopy. Out of 34 cases, 28 cases showed proliferative endometrium on hysteroscopy. Four cases of endometrial hyperplasia, one case of polyp and one case of atrophic endometrium diagnosed on hysteroscopy but histopathology reports were proliferative endometrium. On hysteroscopy, four cases of proliferative endometrium on hysteroscopy showed secretary endometrium on histology.

Barman[6] reported that hysteroscopy in their study revealed Proliferative endometrium 45(52.94%), Secretory endometrium 12(14.12%), Hyperplasticen dometrium 14 (16.47%) and Polyp 14 (16.47).

Table 1: Findings on TVS

		Frequency	Percent
Cervix	Hypertrophy	37	43.6
Endometrium	Endometrial hyperplasia	16	18.8
	Normal	44	51.8
	Polyps	18	21.2
	Submucous fibroid	7	8.2
Myometrium	Adenomyosis	5	5.9
	Ant wall intramural fibroid	2	2.4
	Intramural fibroid	8	9.4
	Normal	67	78.8
Uterus	Hypertrophy	6	72.9
	Normal	23	27.1

Table 2: Findings on hysteroscopy

Hysteroscopic findings	Frequency	Percent
Proliferative	53	62.4
Secretory	12	14.1
Hyperplastic	36	42.4
Polyps	22	25.9
Atrophic	02	2.4
SM fibroids	12	14.1

Table 3: Histopathology findings

Findings on histopathology	Frequency	Percent
Chronic cervicitis	40	47.1
Endocervicitis	4	4.7
Proliferative phase	49	57.6
Disordered proliferative endometrium	2	2.4
Endometrial polyp	24	28.2
Secretory endometrium with chronic cervicitis	9	10.6
Simple hyperplasia without atypia	19	22.4

Table 4: Sensitivity, specificity, PPV and NPV of TVS in comparison with HPR (gold standard)

Findings	Sensitivity	Specificity	PPV	NPV
Proliferative(n-45)	62%	78.6%	82.6%	56.3%
Secretory(n-08)	64.2%	85.3%	46.2%	92.6%
Hyperplastic(n-36)	44.3%	96.3%	74.5%	88%
Polyps(n-45)	51.2%	90.2%	11.2%	98.7%

Table 5: Sensitivity, specificity, PPV and NPV of hysteroscopy in comparison with HPR (gold standard)

Findings	Sensitivity	Specificity	PPV	NPV
Proliferative(n-53)	74.5%	82.6%	83%	74.6%
Secretory(n-12)	84.6%	86.3%	51%	98.6%
Hyperplastic(n-36)	55.2%	95.78%	77.5%	91.3%
Polyps(n-22)	71.6%	99.6%	99.5%	95.6%

Table 6: Findings on TVS, Hysteroscopy and HPR

Findings	TVS and HPR	Hysteroscope and HPR	TVS, Hysteroscope and HPR
Proliferative	27	27	20
Secretory	5	4	4
Hyperplastic	3	3	2
Polyps	1	9	1

In our study, Histopathological report of the study population revealed proliferative phase in 57.6%, chronic cervicitis in 47.1%, Endometrial polyp in 28.2%, Simple hyperplasia without atypia in 22.4%, Endocervicitis in 4.7% and disordered proliferative endometrium in 2.4%.

Barman[6] reported that HPR in their study revealed Proliferative 40 (47.06%), Secretory 20 (23.53%), Hyperplastic 10 (11.76%) and Polyp 10 (11.76%).

In our study, Sensitivity, specificity, PPV and NPV of TVS for diagnosing proliferative endometrium was 62%, 78.6%, 82.6% and 56.3% respectively. Sensitivity, specificity, PPV and NPV of TVS for diagnosing secretory endometrium was 64.2%, 85.3%, 46.2% and 92.6% respectively. Sensitivity, specificity, PPV and NPV of TVS for diagnosing hyperplastic endometrium was 44.3%, 96.3%, 74.5% and 88% respectively. Sensitivity, specificity, PPV and NPV of TVS for diagnosing polyp was 51.2%, 90.2%, 11.2% and 98.7% respectively.

Barman[6] reported that Sensitivity (S), Specificity (SP), positive predictive value (PPV), Negative predictive value (NPV) of TVS in comparison to gold standard H.P report, for diagnosis of hyperplastic endometrium and polyp was 43.75%, 95.65%, 70%, 88% and 50%, 89.16%, 10%, 98.67% respectively.

Jain[8] reported that sensitivity, specificity, PPV, NPV for diagnosis of endometrial hyperplasia on TVS was 81.81, 94.43%, 90%, 95%.

B T Veena[9] studied role of TVS and Diagnostic Hysteroscopy in abnormal uterine bleeding. TVS showed an accuracy of 83.3% in detecting the proliferative phase and 66.67% in detecting the secretory phase.

In our study, Sensitivity, specificity, PPV and NPV of hysteroscopy for diagnosing proliferative endometrium was74.5%,82.6%,83% and 74.6% respectively. Sensitivity, specificity, PPV and NPV of hysteroscopy for diag no singsecre to ryendometrium was 84.6%, 86.3%, 51% and 98.6% respectively. Sensitivity, specificity, PPV and NPV of hysteroscopy for diagnosing hyperplastic endometrium was 55.2%, 95.78%, 77.5% and 91.3% respectively. Sensitivity, specificity, PPV and NPV of hysteroscopy for diagnosing polyp was 71.6%, 99.6%, 99.5% and 95.6% respectively. Barman[6] reported that Sensitivity (S), Specificity (SP), positive predictive value (PPV), Negative predictive value (NPV) of TVS in comparison to gold standard H.P report, for diagnosis of hyperplastic endometrium and polyp was 43.75%, 95.65%, 70%, 88% and 50%, 89.16%, 10%, 98.67% respectively.

Vitner[10] did a comparative study between ultrasonography and hysteroscopy in the diagnosis of uterine pathology. Their results showed that ultrasound has 93% sensitivity, 58% specificity, 84.3% positive and 78.3%, negative predictive value while hysteroscopy had 92% sensitivity, 67% specificity, 87.3% positive and 77.7% negative predictive values. Hysteroscopy had a significantly higher sensitivity in diagnosing intra-uterine fibroids while TVS had a significantly higher sensitivity in diagnosing retained products of conception.

Soguktas[11] compared the diagnostic effectiveness of transvaginal sonography (T, saline infusion sonohysterography, and diagnostic hysteroscopy (HS), with the pathologic specimen as a gold standard in premenopausal women with abnormal uterine bleeding. The positive and negative likelihood ratios of TVS, SIS and HS were calculated by comparison with the final pathological diagnosis. Polypoid lesion was the most common abnormal pathology. LR+and-LR of TVS and HS were 3.13 and 0.15 and 13.7 and 0.02 respectively in detection of any abnormal pathology. HS had the best diagnostic accuracy and the diagnostic accuracy of HS was superior to TVS[12].

CONCLUSION

Transvaginal sonography revealed findings of endometrium as endometrial hyperplasia in 18.8%, polyps in 21.2% and submucous fibroids in 8.2%.
Transvaginal sonography revealed findings of uterine hypertrophy in 72.9%. Transvaginal sonography revealed findings of uterus as adenomyosis in 5.9%, ant wall intramural fibroid in 2.4%, intramural fibroid in 9.4%. Transvaginal sonography revealed findings of cervix as hypertrophied cervix in 43.6%. Hysteroscopic findings revealed proliferative endometrium in 46.2%, polyps in 25.9%, atrophic 2.4%, submucosal fibroid 14.1%, cervical polyps in 25.9%, secretory in 14.1% and hyperplastic in 42.4%.

Histopathological report of the study population revealed proliferative phase in 57.6%, chronic cervicitis in 47.1%, Endometrial polyp in 28.2%, Simple hyperplasia without atypia in 22.4%, Endocervicitis in 4.7% and disordered proliferative endometrium in 2.4%.

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