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Research Article

Role of transvaginal sonography and hysteroscopy in abnormal uterine bleeding: does the diagnostic yield increase by combining transvaginal sonography, hysteroscopy and biopsy?

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ABSTRACT

Background: Abnormal uterine bleeding is the most common complaint of perimenopausal and postmenopausal women. The aim of this study was 1) To evaluate the causes of abnormal uterine bleeding using transvaginal sonography, hysteroscopy and endometrial curettage to achieve the greatest diagnostic accuracy. 2) To determine the sensitivity and specificity of TVS and hysteroscopy in the detection of various uterine pathologies.
Methods: This was a descriptive cross sectional study between January 2013 to June2014 in Sri Manakula Vinayagar medical college and hospital. After obtaining ethics committee approval, 100 consecutive patients with abnormal uterine bleeding between the age group of 35 and 55 years, who consented to participate in the study, were subjected to transvaginal sonography followed by diagnostic hysteroscopy combined with a directed biopsy. TVS and hysteroscopy was performed by two different investigators. The endometrial curettings and any intracavitary lesion were subjected to histopathological examination. Results tabulated and analysed using MS EXCEL and cross tabulation using Epi-info. Sensitivity, specificity, PPV, NPV for each pathology by TVS and hysteroscopy with HPE as the gold standard was calculated. Also the pathology causing abnormal uterine bleeding was computed by taking into account the endometrial characteristics and the associated lesions diagnosed by TVS, hysteroscopy and histopathological examination report.
Results: 61 patients had only single lesions in the form of normal endometrium, atrophic endometrium, endometrial hyperplasia, endometrial polyp, malignancy and IU synechiae whereas 39 patients had lesions like intramural fibroids, adenomyosis, submucus myoma and polyps associated with different types of endometrium. The diagnostic accuracy of TVS and hysteroscopy were comparable for normal endometrium whereas hysteroscopy was found to be more accurate for endometrial polyps, endometrial hyperplasia and atrophic endometrium.
Conclusions: The combination of transvaginal sonography, hysteroscopy and directed biopsy was found to increase the diagnostic yield in patients with abnormal uterine bleeding. As the diagnostic accuracy increased by combining the three modalities, an effective and appropriate management can be planned.

Keywords: Abnormal uterine bleeding, Transvaginal sonography, Hysteroscopy, Biopsy

INTRODUCTION

Abnormal uterine bleeding is the most common gynecological complaint encountered in both perimenopausal and postmenopausal women. Transvaginal sonography is useful to detect causes of abnormal uterine bleeding like fibroids, adenomyosis, endometrial polyp and adnexal pathology and also to determine endometrial thickness and morphology as well as regularity of the endo myometrial border.[1] TVS cannot

definitely exclude sessile and pedunculated lesions of the endometrium and malignancy and also has a high false negative rate in diagnosing focal intrauterine pathology.[2,3] TVS is used as the primary modality in investigating the cause of abnormal uterine bleeding.

Hysteroscopy is an invasive procedure which is less often performed than TVS due to its invasiveness and need for trained personnel but it remains highly sensitive and specific for intra cavitary uterine lesions like endometrial polyps and submucus myomas. It identifies discrete lesions but does not give histological diagnosis.[4]

Dilatation and curettage is considered the gold standard for the diagnosis of AUB but blind curettage covers less than half of the endometrial cavity in 60% of the procedures.[5] A combination of hysteroscopy and directed biopsy is highly sensitive in cases of malignant and premalignant lesions.[6]

The aim of this study was

1. To evaluate the causes of abnormal uterine bleeding using transvaginal sonography, hysteroscopy and endometrial curettage to achieve the greatest diagnostic accuracy.
2. To determine the sensitivity and specificity of TVS and hysteroscopy in the detection of various uterine pathologies.

METHODS

This is a descriptive cross sectional study carried out in Sree Manakula Vinayagar medical college & hospital between January 2013 and June 2014. Institutional ethics committee approval was obtained. 100 consecutive patients with complaints of abnormal uterine bleeding between the age group of 35 and 55 years who consented to participate in the study were selected, the exclusion criteria being active pelvic infection, obvious vaginal, vulval or cervical causes of bleeding and patients on hormones.

All the patients were subjected to general and pelvic examination followed by basic laboratory workup.

Conventional 2D transvaginal sonography was performed using Acuson X300 scanner with 4-7 MHZ endovaginal probe in all these patients by one of the investigators and following information was recorded in a proforma. The endometrium was categorized as proliferative, secretory, atrophic or hyperplastic and presence of intramural or submucus fibroid, endometrial polyps, adenomyosis, any suspected malignancy, endometrial thickness and adnexal mass were noted.

These patients were admitted and diagnostic hysteroscopy was performed under short GA using a Karl Storz hysteroscope with 30^0 fibreoptic lens with normal saline as the distension media. Endometrium was again categorized as proliferative, secretory, atrophic or hyperplastic and also presence of any intra cavitary lesions were noted. TVS and hysteroscopy were performed by different gynecologists, the person performing hysteroscopy being blinded for TVS findings. At the same time hysteroscopy guided endometrial curettage was performed and curettings and polyps obtained were sent for histopathological examination.

The results were tabulated and analysed using MS excel and cross tabulation using Epi-info software and sensitivity and specificity, positive predictive value and negative predictive value for each pathology was calculated using histopathological examination report as the gold standard. The cause of AUB was computed taking into account the findings obtained by transvaginal sonography, hysteroscopy and biopsy report.

RESULTS

The mean age of the patients with AUB was 42.9 years. 97 patients were multiparous and 3 were nulliparous. 71 patients presented with complaints of menorrhagia, 19 with postmenopausal bleeding, 8 with irregular bleeding and 2 with blood stained discharge.

Taking endometrial lesion as the primary pathology detected by each modality the additional pathology detected by TVS and hysteroscopy in presented in Table 1.

Table 1: Pathology detected by each modality and the additional pathology detected by TVS and hysteroscopy.

EM pathology detected by each modality	TVS findings					Hysteroscopy findings					
	No. associated lesions	IM fibroid	Adeno-myosis	EM polyp	SM fibroid	No. associated lesions	IM fibroid	Adeno-myosis	EM polyp	SM fibroid	IU synechia
Normal EM	33	15	4	3	-	26	-	-	11	1	-
Atrophic EM	6	0	1	0	0	11	-	-	4	1	-
End. hyperplasia	17	8	3	3	3	24	-	-	10	2	-
Malignancy	1	-	-	-	-	1	-	-	-	-	-
EM polyp	3	0	-	-	-	8	-	-	-	-	-
IU synechia	-	-	-	-	-	-	-	-	-	-	1

TVS detected 23 cases of intramural fibroid and 8 cases of adenomyosis along with different types of endometrium. 6 patients were diagnosed to have endometrial polyp along with different types of endometrium. In 3 patients endometrial polyp was the primary lesion as endometrial characteristics could not be defined. 3 patients with endometrial hyperplasia were suspected to have a sub mucus fibroid along with endometrial lesion of which 2 were confirmed by hysteroscopy subsequently. The intramural fibroids varied in size between 2 cm to 6 cm and the diagnosis of adenomyosis were made by the typical USG findings like anteroposterior asymmetry of the myometrium, poor endomyometrial differentiation, presence of myometrial cysts etc.

Hysteroscopy diagnosed almost 25 cases of endometrial polyp ranging between 2 mm to 1 cm and 4 cases of submucus fibroid along with the primary endometrial findings and 8 cases of endometrial polyp individually. It also detected 1 case of IU synechia but we did not diagnose any cases of adenomyosis even though typical adenomyotic features by hysteroscopy are defined.

1 patient was diagnosed to have a malignant growth by both TVS and hysteroscopy. The histopathological report of the endometrial curettings obtained on D & C guided by hysteroscopy is depicted in Table 2.

Table 2: Pathological confirmation not available for intramural or submucus fibroid and adenomyosis.

HPE report n-100	No.
Normal endometrium	48
Endometrial hyperplasia	33
Atrophic EM	2
Malignancy	1
EM polyp	11
Normal EM + polyp	3
Endometrial hyperplasia + polyp	2

Taking into consideration the findings obtained by all the three modalities (TVS, hysteroscopy and endometrial histopathology) the final diagnosis was made which is depicted in Table 3.

Table 3: Diagnosis combining endometrial characteristics and associated lesions.

Endometrial pathology	No. associated lesions	IM fibroid	Adenomyosis	EM polyp	SM fibroid
Normal endometrium	28	12	5	3	1
Atrophic endometrium	2	0	-	1	1
Endometrial hyperplasia	21	9	2	2	2
Malignancy	1	-	-	-	-
EM polyp	9	-	-	-	-
IU synechiae	1	-	-	-	-

Single lesions with histological confirmation (endometrial pathology only) was as follows: 28 patients had normal endometrium, 2 had atrophic endometrium, 21 patients had endometrial hyperplasia and 9 patients had endometrial polyps and 1 patient was diagnosed to have malignancy which was an adenosquamous carcinoma (Total - 61).

Other patients (No-39) had an additional pathology along with the endometrial lesion. 12 IM fibroids and 5 adenomyosis were found to be associated with normal endometrium whereas 9 IM fibroids and 2 cases of adenomyosis were found to be associated with endometrial hyperplasia. 5 patients were diagnosed to have EM polyp along with the endometrial lesions whereas in 9 patients with EM polyps endometrial lesion was not defined. 4 patients were diagnosed to have sub mucus myoma and 1 patient had IU synechiae.

Histological confirmation is not available for IM fibroids, adenomyosis, sub mucus myoma and IU synechiae as many of these patients were treated by conservative management.

On subsequent follow up of these patients 2 cases of Intramural fibroid, 1 case of submucus fibroid and 5 cases of adenomyosis were confirmed after hysterectomy. The above results indicate that combining all the three modalities will increase the diagnostic accuracy in cases of AUB.

The sensitivity, specificity, positive predictive value and negative predictive value of TVS hysteroscopy for different lesions with histopathological examination as the gold standard is shown in Table 4.

Table 4: The sensitivity, specificity, positive predictive value and negative predictive value of TVS hysteroscopy for different lesions with histopathological examination as the gold standard.

Histopathological examination report	TVS				Hysteroscopy			
	Sensitivity%	Specificity%	PPV%	NPV%	Sensitivity%	Specificity%	PPV%	NPV%
Proliferative endometrium	30.43	90.91	50	81.4	27.27	88.61	40	81.4
Secretory endometrium	46.67	71.83	41.18	76.12	40.74	80.28	44	78.08
Endometrial hyperplasia	45.71	76.56	51.61	72.06	60	78.12	60	78.12
Atrophic endometrium	50	94.95	16.67	98.95	100	85.71	12.5	100
Endometrial polyp	56.25	91.67	56.25	91.678	93.75	78.57	45.45	98.5
Malignancy	100	100	100	100	100	100	100	100

The sensitivity and specificity of TVS and hysteroscopy for proliferative and secretory endometrium were comparable whereas the sensitivity and specificity of hysteroscopy for endometrial hyperplasia was better than TVS (60% & 78.12% vs. 45.71% & 76.56%) Again hysteroscopy was found to be more sensitive and specific in predicting atrophic endometrium than TVS (100% & 85.71% vs. 50% & 94.95 %) and also accurate in the diagnosis of endometrial polyp (93.75 % & 75.5% vs. 56.25% 91.67%). Both TVS and hysteroscopy diagnosed a case of malignancy which was confirmed by histopathological examination.

DISCUSSION

The successful management of AUB depends upon accurate diagnosis which in turn depends upon choosing the investigation with highest sensitivity and specificity for any pathology causing AUB.

TVS was found to have a sensitivity and specificity of 69.3% and 82.7% in differentiating normal from pathological endometrium in a study by Conoscenti et al.[7] The study also showed that TVS had a poor diagnostic accuracy in detecting endometrial benign lesions, polyps and malignancy. In our study we found that sensitivity and specificity for normal endometrium to be low and for other benign endometrial lesions the sensitivity and specificity were as follows: 45.71% & 75.56% for endometrial hyperplasia 50% & 94.95% for atrophic endometrium and 56.25% & 91.67% for endometrial polyp. 1 patient suspected to have a malignant growth was confirmed by histopathology.

TVS showed a sensitivity and specificity of 77.3 & 76% for intramural fibroids.[8] For adenomyosis the sensitivity and specificity of TVS was 84.55 & 43.40 %.[9] In our study 23 cases of IM fibroids varying in size between 2 cm and 6 cm were diagnosed by TVS and 8 patients were diagnosed to have adenomyosis but histological confirmation was not possible due to non-availability of representative sample. TVS also identified submucus myoma but is not very specific as it can be mistaken for endometrial polyp.[10] In our study too TVS detected submucus myoma in 3 cases of which 2 were confirmed subsequently by hysteroscopy

In a study by Sheetal et al. the sensitivity and specificity of hysteroscopy for proliferative endometrium was 78.5% and 86.2 % and for secretory endometrium 54.54% and 93.58%.[11] Our study showed a sensitivity and specificity of 27.27% and 88.61% for proliferative endometrium and 40.74% and 80.28% for secretory endometrium. For endometrial hyperplasia the sensitivity and specificity was found to be 75% and 92.5% in the above study.[11] A study on validity of hysteroscopy showed a sensitivity and specificity of 63% and 92% for endometrial hyperplasia and 89% and 96% for atrophic endometrium.[12] The sensitivity and specificity for endometrial hyperplasia and atrophic endometrium was found to 60% and 78.12% and 100% and 85.71% respectively in our study which was comparable to the previous studies. The highest sensitivity and specificity by hysteroscopy was found for endometrial polyps and malignancy in our study which was similar to other studies. Sheetal et al. reported a sensitivity and specificity of 100% and 95.78% for endometrial polyps and 100% and 98.97% for malignancy.[11] Tajossadat et al. reported a sensitivity and specificity of 93% and 100% for EM polyps and 100% and 96.4% for submucus myoma.[13] In our study 4 cases of sub mucus myoma and 1 case of IU synechiae were diagnosed by hysteroscopy. As discussed previously in 60% of patients undergoing blind curettage only half the cavity was curetted whereas in another study it was found blind curettage covers as much as 60% of the cavity but may miss polyps.[5,14]

The above findings indicate that each modality has its own limitations. The accuracy of TVS in the diagnosis of IM fibroids and adenomyosis is good but it cannot differentiate between EM polyps, hyperplasia and early cancers. Hysteroscopy is superior to TVS in the diagnosis of intracavitary lesions like polyps and submucus myoma. Mojgan Barati et al. recommends hysteroscopy for patients with AUB as the second step even if TVS is normal.[16] Sensitivity to endometria hyperplasia by hysteroscopy may be high but it cannot replace histological diagnosis to differentiate between benign and malignant pathology. Hysteroscopy also guides us to perform a directed biopsy from the suspected lesions. As described in an earlier study when both TVS and hysteroscopy are combined the diagnostic accuracy increased in cases of AUB.[17]

Taking the endometrial characteristics also into consideration along with pathology like intramural fibroids and adenomyosis, an effective strategy for management can be planned. Diagnosis of a normal endometrium or normal endometrium with small fibroid or adenomyosis in the perimenopausal age group can be effectively treated with medical management like antifibrinolytic agents whereas fibroid or adenomyosis associated with benign endometrial hyperplasia would warrant treatment with progesterones. A submucus fibroid or polyp overlooked by transvaginal sonography associated even with a normal endometrium could be a cause of persistent irregular bleeding when hysteroscopy is not performed. An atrophic endometrium is amenable to treatment with hormone replacement whereas atrophic endometrium associated with submucus myoma missed by TVS may need surgical management.

To conclude, a combination of all the three modalities (Transvaginal sonography/hysteroscopy and endometrial biopsy) was found to increase the diagnostic accuracy in patients with abnormal uterine bleeding and will effectively guide us in planning the appropriate management for these patients.

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