Original Article

Hysterosonography and Transvaginal Ultrasonography for Detection of Intrauterine Lesions in Women with Abnormal Uterine Bleeding

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Abstract

Abnormal Uterine bleeding (AUB) is one of the frequent complaints of female patients of all ages.AUB is present in 33% of women referred to gynecologists and this increases to 69% in peri-menopausal and post-menopausal women. About 10 % of postmenopausal bleeding results from endometrial cancer and imaging is the mainstay for its identification. Imaging plays a vital role in differentiating structural lesions like endometrial carcinomas, myomas and polyps which require surgical management from functional disorders requiring medical management. Transvaginal Ultrasonography (TVUS) is the first line imaging modality for AUB after selecting the patients with inconclusive pelvic ultrasonographic results. Hysterosonography (HSG) also plays a pivotal role.

Objectives: To compares between TVUS and HSG in the detection and identification of intrauterine lesions in patients with abnormal uterine bleeding, and comparing the sensitivity and specificity of the respective methods in the detection of such lesions.

Methods: Thisstudy was conducted in Department of Radiology, Mayo Hospital Lahore. Fifty women presented with history of abnormal uterine bleeding were included in this study. Pregnancy was ruled out by transabdominal scan. Transvaginal ultrasound and hysterosonography were performed in all the patients. All the data were coded and analyzed using SPSS version 20.

Results: Out of 50 patients, 10 patients had intramyometrial fibroid, 11 had submucosal fibroid, endometrial polyp was found in 17 patients and 2 patients had thickened endometrium (thickness > 8mm). The sensitivity and specificity of TVUS was found to be 83.2% and 82.7% respectively whereas HSG showed sensitivity and specificity of 95.4% and 91.5% respectively. In the detection of the submucosal fibroid and endometrial polyp, HSG showed highest sensitivity and specificity as compared totransvaginal ultrasound.

Conclusion: Both the TVUS and HSG have comparable sensitivity and specificity in the detection of endometrial disease in patients presented with abnormal uterine bleeding however HSG is more sensitive in the detection of polyps.

Keywords: Trans vaginal ultrasound (TVUS), Hysterosonography (HSG), Endometrial polyps, Abnormal Uterine bleeding.

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Introduction

Abnormal Uterine bleeding (AUB) is one of the frequent complaints of female patients of all ages.[1] AUB is present in 33% of women referred to gynecologists and this increases to 69% in peri menopausal and postmenopausal women. About 10% of postmenopausal bleeding results from endometrial cancer and imaging is the mainstay for its identification.[2]

In women of child bearing age, abnormal uterine bleeding includes any change in menstrual-period duration, amount or frequency and also the bleeding in between cycles.[3] In postmenopausal women, abnormal uterine bleeding includes vaginal bleeding for 12 months or more after menopause.[4]

AUB can be due to anovulation, pregnancy related pathologies, hormonal disorders or structural lesions. The etiology may be local anatomical lesions; benign or malignant, endocrine disorders, organic disorders or iatrogenic causes. Imaging plays a vital role in differentiating structural lesions like endometrial carcinomas, myomas, polyps, atrophy etc which require surgical management from functional disorders requiring medical management.[1]

This study, however, will focus on the abnormal bleeding caused by intrauterine structural lesions. Transvaginal Ultrasonography (TVUS) is the first line imaging modality for AUB after selecting the patients with inconclusive pelvic ultrasonographic results.[1] Hysterosonography (HSG) also plays a pivotal role and was introduced by Nannini et al. in 1981.[5] With the help of a catheter, they infused sterile saline into the uterine cavity causing its expansion and thus providing an echographic contrast with the adjacent structures to allow for better visualization of the endometrium.[5,6]

As compared to TVUS, HSG provides better images, with a more accurate measurement of the endometrial thickness, heterogeneity and etiology of the thickness, as well as distinguishing between focal and diffuse abnormalities.[7]

The current study is aimed at providing a comparison between TVUS and HSG in the detection and identification of intrauterine lesions in patients with abnormal uterine bleeding, and comparing the sensitivity and specificity of the respective methods in the detection of such lesions.

Methods

This comparative study was conducted in Department of Radiology, Mayo Hospital Lahore from November 2015 to April 2016. 50 women of the age group 15 to 45 years, presented with history of abnormal uterine bleeding fulfilling the inclusion criteria were included in this study. Pregnancy was ruled out by transabdominal scan.Informed consent was taken. The age, symptoms, medical history and clinical findings of all the patients were recorded. Transvaginalscan as well as hysterosonography was performed in all patients and findings were recorded.

The patient was placed in the lithotomy position. Cervix was cleaned using piodene solution and speculum was inserted. Cervical os was localised and cleaned with piodene solution. Foleys catheter of size 5 to 7 French was inserted through the os and was inflated using 2 ml of normal saline and speculum was removed. A standard transvaginal ultrasound was inserted alongside the catheter and 10 to 20 ml of normal saline was instilled into the endometrial cavity.

The following variables were assessed in both TV-US and HSG. Endometrial thickness > 8 mm, presence of submucosal fibroid, presence of intramyometrial fibroid, presence of endometrial polyp and presence of any adnexal pathology. Hypoechoic lesions altering the endometrial cavity were considered submucosal fibroid. Hypoechoic lesions in the myometrium were considered intra myometrial fibroid. Hyperechoic lesions within the endometrial cavity were considered as polyp. TVUS and HSG were performed by the single consultant radiologist. It was performed in TOSHBA Ultrasound machine using 6.5MHZ multi frequency transvaginal probe. Both the TVS and HSG were performed by consultant radiologist of Mayo Hospital. The patients were followed up after respective surgeries. The histopathological analysis of the lesions was done in the Pathology Department of Mayo Hospital, Lahore and the histopathology reports were considered as the gold standard. All the findings were collected in a predesigned proforma. The data were coded and analysed using SPSS version 20. The sensitivity, specificity, positive predictive value, negative predictive value, false positive and false negative were calculated.

Results

Out of 50 patients, 10 patienthad intra-myometrial fibroid, 11 had submucosal fibroid, endometrial polyp was found in 10 patients and 2 patients had thickened endometrium (thickness > 8mm).

Table 1: *Abnormal findings in Surgery, TVS and Hysterosonography.*

Abnormal Surgery Findings	N	%
Polyp	17	20
Intramymetrial fibroid	10	32
Submucosal fibroid	11	26
Endometrial thickness	2	22
Adenxal pathology	0	0
Abnormal TVS Findings		
Polyp	6	8
Intramyometrial fibroid	14	28
Submucosal fibroid	4	12
Endometrial thickness	17	34
Adenxal pathology	0	0
Abnormal HSG Findings		
Polyp	14	20
Intramymetrial fibroid	16	32
Submucosal fibroid	9	24
Endometrial thickness	6	20
Adenxal pathology	0	0

Table 2: *Comparison between surgical findings and TVS and hysterosonography.*

TVS	Surgical Findings		
	Abnormal	Normal	Total
Abnormal	38	3	41
Normal	2	7	9
HSG			
Abnormal	38	2	43
Normal	2	8	7
Total	40	10	50

Table 3: *Comparison between Surgical Findings and TVS and Hysterosonography for Endometrial Polyps.*

Surgical Findings	Present	Absent	Total
	17	33	50
TVS			
Present	5	1	6
Absent	12	32	44
HSG			
Present	16	2	18
Absent	1	31	32
Total	17	33	50

Table 4: *Comparison between Surgical Findings and TVS and Hysterosonography for Submucosal Fibroids.*

Surgical Findings	Present	Absent	Total
	11	39	50
TVS			
Present	3	1	4
Absent	8	38	46
HSG			
Present	6	3	9
Absent	5	36	41

Table 5: *Sensitivity (S), specificity (E), positive predictive value (PPV), negative predictive value (NPV), false-positive (FP), false-negative (FN), value for TVUS and HSG in the diagnosis of endometrial polyps and submucosal fibroids in patients with abnormal uterine bleeding.*

Abnormal Endometrial Findings						
	S	E	PPV	FP	NPV	FN
TVS	95%	70%	93%	7%	78%	22%
HSG	95%	80%	86.6%	13.4%	80%	20%
Endometrial Polyps						
TVS	29.4%	96.9%	83.3%	16.7%	72.7%	27.2%

HSG	94.1%	93.9%	88.8%	11.1%	96.8%	3.1%
Submucosal fibroids						
TVS	27.2%	97.4%	75%	25%	82.6%	17.4%
HSG	54.5%	93.3%	66.6%	33.3%	87.8%	12.2%

Discussion

Intrauterine pathologies including fibroid and endometrial polyps are common in women of reproductive age. Imaging plays a vital role in differentiating structural lesions like endometrial carcinomas, myomas, and polyps which require surgical management from functional disorders requiring medical management. As compared to TVUS, HSG provides better images, with a more accurate measurement of the endometrial thickness, heterogeneity and etiology of the thickness, as well as distinguishing between focal and diffuse abnormalities. HSG also helps in avoiding invasive diagnostic investigations as well as provides better pre-operative evaluation of those patients who may require surgical intervention. It is relatively low in cost with better patient tolerance for the procedure as well as with no major complications.[5,6]

The present study is to compare the TVUS and HSG in the diagnosis of endometrial pathologies. In most of the cases, surgical findings and histopathology reports are taken as a gold standard. A single observer did all the HSG and TVUS so to eliminate the chances of inter-observer variability.[7]

HSG is quite effective in diagnosing endometrial abnormalities with a sensitivity of 95% and specificity of 80% similar to the results reported by other studies and also with a high NPV implying to a very less number of undiagnosed intra-cavitatory lesions.

In this study endometrial polyp was found in 17 patients, intramyometrial fibroid in 10, submucosal fibroid in 11 and thickened endometrium was found in 2 patients. Polyps were found to be the most common pathology detected in women of reproductive age period presented with the abnormal uterine bleeding. This is similar to the study conducted by Dueholm et al who reported having observed 35% of polyps or myomas in a series of 470 premenopausal patients with abnormal uterine bleeding.[8] In this study, only two cases were found to be of endometrial hyperplasia which presented “normal” study in HSG and TVUS which corresponds to the study done by Ceccato Jr. et al.[9]

Regarding the diagnosis of polyp, HSG is found to have more sensitivity and specificity as compared to TVUS. In this study, the sensitivity and specificity of HSG in detection of endometrial polyps is found to be 94.1% and 93.9% respectively, with the respective PPV and NPV of 88.8% and 96.8%. Similarly the sensitivity and specificity of TVUS is found to be 29.4% and 96.9% respectively with the respective PPV and NPV of 83.3% and 72.7%. This is similar to the other studies. A study by Jacques et al found accuracy of 91.3%. Similarly, Kamel et al study shows accuracy of 93.3% in the diagnosis of polyps usingHSG.[10,11] Our studies also show similar results. Schwärzler et al. study in 104 patients with AUB have observed that HSG increases the diagnostic rate ofpolyps from 56% to 84%, however, using HSGthe detection of neoplastic and preneoplasticconditions of the endometrium was not found to be improved.[12] This is due to the reason that HSGis more accurate in diagnosis offocal than diffused lesions. Similarly the sensitivity and specificity of HSG in the detection of the submucosal fibroid is 54.5% and 93.3% respectively as compared to TVUS with the respective sensitivity and specificity of 29.4% and 96.9%. Elsayes et al., observed that HSG is particularly of importance in diagnosing between anovulatory uterine bleeding and AUB due to anatomical lesions in premenopausal women and to differentiate between intracavitatory lesions and endometrial atrophy in post-menopausal women so to infer for biopsy and/or surgical management.[6]

Magnetic Resonance Imaging (MRI) is analternative diagnostic modalities for endometrial pathologies. It is a non-invasive procedure. It is a precise technique in diagnosis of myomas particularly when selecting the appropriate approach in removal of myomas. However, few studies shows the failure of MRI in diagnosis of endometrial polyps.[13] Furthermore, it is not readily available in all the centers especially in context of developing countries.

HSG could be performed easily and it is also cost effective and could be done in an out- patient setting. Foleys catheter could be used for catheterization which is not expensive. No complications were noticed during the procedure. So, HSG has a great role in detect-

ion of malignant and benign diseases in women of both pre and post menopausal ages who have abnormal uterine bleeding. This has also important role in asymptomatic patients with endometrial abnormalities at TVUS. HSG may be an alternative to hysteroscopy. Besides being easily available and inexpensive, it is well tolerated and could be performed easily. So it has a particular important in developing countries. However, TVUS remains the initial imaging modality for diagnosing causes of AUB in postmenopausal women due to its high sensitivity, low cost, easy availability, tolerability and effectiveness in diagnosing other intracavitatory lesions.

Conclusion

Both the TVUS and HSG has comparable sensitivity and specificity in the diagnosis of endometrial disease in patients who have abnormal uterine bleeding however in the diagnosis of polyp HSG is more sensitive. In the developing countries where hysteroscopy is not easily available, HSG may be anuseful alternative modality.

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