Original research article

TRANSVAGINAL SONOGRAPHY VERSUS SALINE INFUSION SONOHYSTEROGRAPHY FOR EVALUATION OF ABNORMAL UTERINE BLEEDING IN PERIMENOPAUSAL AGE GROUP

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Abstract

Introduction: The present study was conducted to evaluate the validity of Transvaginal Sonography (TVS) in perimenopausal women with abnormal uterine bleeding (AUB), validity of saline infusion sonohysterography in perimenopausal women with abnormal uterine bleeding and to compare the diagnostic accuracy of the above mentioned modalities.

Material and Methods: It was a prospective comparative study of TVS and Saline Infusion Sonohysterography (SIS) in 100 perimenopausal women presenting with AUB. The findings of TVS and SIS was compared with histopathology.

Result: The sensitivity of TVS for submucosal fibroid, polyp, intramural fibroid and endometrial hyperplasia was found to be 50%,44.44%, 40%, 33.33% respectively while specificity being 88.29%, 95.60%, 88.88%, 95.60% respectively. The sensitivity of SIS for endometrial hyperplasia and submucosal fibroid was found to be same (66.66%) whereas for polyp and intramural fibroid was 55.55% and 50% respectively. Specificity of SIS for polyp, endometrial hyperplasia, intramural fibroid and submucosal fibroid was found to be 98.90%,95.60%,92.2% and 90.42% respectively. Overall sensitivity and specificity of TVS was 79.4% and 75.8 % respectively whereas for SIS is 82.4% and 80.3% respectively.

Conclusion: SIS is simple, highly sensitive and specific technique to detect intrauterine pathology.

Keywords: Abnormal uterine bleeding, transvaginal sonography, saline infusion sonohysterography.

INTRODUCTION

Menstrual disorders are a major reason for gynaecological consultations around the world and abnormal uterine bleeding (AUB) is one of the main reason of premenopausal women consulting a gynaecologist.[1,3] Nesse et al (1989) in his study found that up to 20% of visits to the gynaecological OPD are for abnormal uterine bleeding.[4]

Abnormal uterine bleeding includes any change in menstrual-period, frequency, duration, amount or its regularity.[1,6] Dysfunctional uterine bleeding describes the spectrum of abnormal menstrual bleeding patterns that can occur in anovulatory women who have no medical illness or pelvic pathology.[2]

Transvaginal sonography (TVS) has become a popular test for assessment of AUB. The primary advantage is the ability to place high frequency transducer nearer to the region of interest, permitting optimal visualization of the uterus, endometrial pattern, its thickness and echogenicity. In addition to this it also visualises cervix, ovaries, adnexal regions and cul-de-sac. Because it is noninvasive and inexpensive, it is frequently used as a primary tool for abnormal uterine bleeding. Goldstein SR, (1994) in his study found the problem with TVS is that focal hyperlasia and polyps cannot always be differentiated.[5] A few myometrial abnormalities can be confused with endometrial ones.

Saline infusion sonohysterography (SIS) is the term used for ultrasound imaging of the uterine cavity, using sterile saline solution as a negative contrast medium. It imitates

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the clarity and exquisite definition of the uterine cavity afforded by amniotic fluid during pregnancy. SIS is easy, cost-effective, patient friendly procedure which obviates the need for further invasive test such as diagnostic hysteroscopy . It clearly delineates the inner landscape of the endometrial cavity and requires no preparation except an empty bladder. The only disadvantage of SIS is that small irregularities caused by blood clots or endometrial protrusions were frequently misinterpreted as polyps or submucosal fibroids. This occurs as the projections towards cavity in FIGO type one and two myomas might disappear due to marked distension of the cavity, making the differentiation little difficult between the two.

This study was done to evaluate the validity of Transvaginal Sonography in perimenopausal women with abnormal uterine bleeding, to evaluate the validity of Saline infusion sonohysterography in perimenopausal women with abnormal uterine bleeding, to compare the diagnostic accuracy of the above mentioned modalities.

MATERIAL AND METHODS

The present study was carried out in the Department of Obstetrics and Gynaecology in collaboration with the Department of Radiology at Shri Ram Murti Smarak Institute of Medical Sciences, from May 2014 to May 2015.

Hundred perimenopausal women in age group 40-50 years with abnormal uterine bleeding over a period of one year were selected from indoor and outdoor patients. Married nulliparous or parous , with uterine size <12 weeks, having no obvious pelvic pathology were included in this study. Patients with acute pelvic infection, abnormal pap smear, uterine size more than 12 weeks, known case of thyroid dysfunction, hyperprolactinemia, blood dyscrasias were excluded from the study. Known or suspected case of genital malignancy, patients on hormonal treatment within 6 months of recruitment, having obvious pelvic pathology or any recent pregnancy event were also excluded from the study.

After taking informed consent and counseling of the patients, detailed history and complete examination was done. The patients were subjected to transvaginal sonography in post menstrual phase with Siemens ultrasound machine using 7-12 MHz transvaginal transducer. After scanning, the transvaginal probe was removed from vagina and SIS was performed in the same sitting. Balloon was gently inflated with 1-3 cc of saline. Around 25 cc of saline was required to distend the uterine cavity and delineate the endometrial lining depending upon the uterine size, vaginal efflux, contrast quality and patient comfort . Findings of TVS and SIS were noted and the patients were managed according to hospital protocol. TVS and SIS findings were confirmed by histopathology report.

Statistical testing was conducted with the statistical package for the social science system version SPSS 17.0. Continuous variables are presented as mean ± SD and categorical variables are presented as absolute numbers and percentage . The comparison of normally distributed continuous variables between the groups was performed using Student's t test. Nominal categorical data between the groups were compared using Chi-square test or Fisher's exact test as appropriate. Sensitivity, specificity, PPV, NPV were calculated to analyze the diagnostic accuracy of SIS and TVS correlating findings with histopathology. For all statistical tests, p value less than 0.05 was taken to indicate a significant difference.

RESULTS

Out of 100 studied women maximum number of patients i.e. 57% were seen in age group of 45- 50 years. Mean age was 44.32 ± 3.37. Maximum number of patients (61%) belonged to lower socio-economic status whereas 38% patients were from middle socio-economic . We found that intracavitary lesion such as polyp, hyperplasia and myomas were more commonly seen in multiparous women as compared to nulliparous and primiparous. Intracavitary lesions were observed more common in overweight women (BMI>24.9) kg/m^2. of these 100 patients, 65 patients had no history of usage of contraceptives. Barrier was used by 18 %, 12 % had undergone tubal ligation and rest five percent gave positive history of oral contraceptive pills. Out of 100 women presenting with AUB, 49 % had presented within three years of onset of their symptoms wheareas 38% presented within one year.

Table-1 shows of 100 studied patients, TVS diagnosed correctly four out of nine polyps. Sensitivity and specificity of TVS for polyp was 44.44% and 95.60% . Out of nine endometrial hyperplasia , three were correctly diagnosed by TVS and six were missed making sensitivity 33.33% and specificity 95.60%. Out of six, three submucous fibroid were correctly dignosed by TVS, making sensitivity and specificity 50% and 88.29% respectively. Four out of ten intramural fibroid were correctly diagnosed by TVS with sensitivity and specificity of 40% and 88.88%.

Table-1: Distribution of cases on the basis of TVS findings and Histhopathology

	Histopathology						P Value
	H	IF	N	P	SF		
	n (%)	n (%)	n (%)	n (%)	n (%)	Total	
H	**3 (42.9%)**	1 (14.3%)	3 (42.9%)	0 (0.00%)	0 (0.00%)	7	<0.001
IF	2 (14.3%)	**4 (28.6%)**	6 (42.9%)	0 (0.00%)	2 (14.3%)	14	
N	3 (5.3%)	2 (3.5%)	**50 (87.7%)**	1 (1.8%)	1 (1.8%)	57	
P	1 (12.5%)	0 (0.00%)	3 (37.5%)	**4 (50.0%)**	0 (0.00%)	8	
SF	0 (0.00%)	3 (21.4%)	4 (28.6%)	4 (28.6%)	**3 (21.4%)**	14	
Total	9 (9.0%)	10 (10.0%)	66 (66.0%)	9 (9.0%)	6 (6.0%)	100	

Endometrial hyperplasia (H), Intramural fibroid (IF), Normal (N), Polyp (P), Submucous fibroid (SF)

After TVS all 100 patients were subjected to SIS. In most patients a good visualization was obtained About 81 % patients required 21-30 minutes while 14 % patients required 10-20 minutes. Only five percent patients required more than 30 minutes using 20-30 cc of saline. The mean volume of saline used was 25.25 ± 4.46 c.c . No patient had any post procedure complication which included discharge per vaginum, spotting or bleeding per vaginum or post procedure fever, only three patients had mild discomfort after the procedure which was relieved by rest. Out of 100 patients, 95 had no operational problem while bubbles were seen in three patients and two patients had vaginal efflux.

Table 2 shows that out of nine polyps, five were correctly diagnosed by SIS and four were missed. Sensitivity and specificity of SIS for polyp is 55.55% and 98.90% respectively. In endometrial hyperplasia, six were correctly diagnosed while three were missed with a sensitivity and specificity of 66.66% and 95.6% respectively. In ten cases of intramural fibroids , five were correctly diagnosed by SIS.

Table 2: Distribution of cases on the basis of SIS findings and Histhopathology

SIS Findings	Histopathology						P Value
	H	IF	N	P	SF		
	n (%)	n (%)	n (%)	n (%)	n (%)	TOTAL	
H	**6 (60.0%)**	2 (20.0%)	1 (10.0%)	0 (0.00%)	1 (10.0%)	10	<0.001
IF	1 (8.3%)	**5 (41.7%)**	6 (50.0%)	0 (0.00%)	0 (0.00%)	12	
N	1 (1.7%)	3 (5.1%)	**53 (89.8%)**	1 (1.7%)	1 (1.7%)	59	
P	0 (0.00%)	0 (0.00%)	1 (16.7%)	**5 (83.3%)**	0 (0.00%)	6	
SF	1 (7.7%)	0 (0.00%)	5 (38.5%)	3 (23.1%)	**4 (30.8%)**	13	
Total	9 (9.0%)	10 (10.0%)	66 (66.0%)	9 (9.0%)	6 (6.0%)	100	

Endometrial hyperplasia (H), Intramural fibroid (IF), Normal (N), Polyp (P), Submucous fibroid (SF)

Out of six submucosal myomas, four were correctly diagnosed by SIS. Sensitivity and specificity of the test was observed 50% and 92.22% and 66.6% and 90.4% for intramural fibroids and submuosal myomas respectively.

DISCUSSION

Pathological uterine lesions causing abnormal uterine bleeding are the major determinant of therapeutic approach in such patients and poses a great diagnostic dilemma. Thus the need for accurate and easily accessible diagnostic modalities is undisputable. Many diagnostic modalities are available and use of invasive procedure is a common place. Transvaginal sonography (TVS) has become a vital tool for evaluation of abnormal uterine bleeding in recent years.

It was seen that increasing BMI was associated with increased incidence of abnormal bleeding. Overweight females have higher incidence of having abnormal bleeding pattern. In observational study by Nouri et al (2014), found that increased BMI has strong association with abnormal uterine bleeding.[7]

We observed that TVS over-diagnosed submucous and intramural fibroid by 57% and 71% respectively, while missing out 55% of polyps and 66% endometrial hyperplasia. Thus the difficulty in making exact diagnosis with TVS is apparent in cases of intracavitary abnormalities as well as in differentiating endometrial polyps from endometrial hyperplasia. Similar problem were encountered by Saidi et al(1997) and Ryu et al(2004).[8,9]

Ten patients had endometrial hyperplasia on SIS whereas histopathology confirmed hyperplasia in 60 % patients. Thus in particular for endometrial hyperplasia SIS was found to be more sensitive as compared to TVS i.e. 66.66% vs 33.33%. However specificity of both the tests was same for endometrial hyperplasia. So SIS could easily distinguish between normal endometrium and endometrial hyperplasia. Normal endometrial cavity was seen as smooth endometrium with same thickness all over the cavity. Hyperplastic endometrium was seen as irregular and thick endometrium. Soares et al (2000) in his study found 100% sensitivity, 100% PPV and 100% diagnostic accuracy for endometrial polyp, fibroids and endometrial hyperplasia by SIS.[10]

In detection of polyp with SIS,we found that sensitivity and specificity of 55.55% , 98.90% respectively with diagnostic accuracy of 95.0%, which is greater than that of TVS. On SIS, polyp was seen with smooth margin of varying size, base of the polyp could be easily defined. In concordance of our findings Kamel et al (2000) in a study of 106 patients reported 93.3% sensitivity, 94.6% PPV and 93.3%

Table-3: Comparison of TVS and SIS for diagnosing intracavitary lesion (ICL) in perimenopausal women

Intracavitary lesion		Sensitivity	Specificity	PPV	NPV	Diagnostic Accuracy
P	TVS	44.44%	95.60%	50%	94.56%	91%
	SIS	55.55%	98.90%	83.33%	95.74%	95%
H	TVS	33.33%	95.60%	42.85%	93.54%	90%
	SIS	66.66%	95.60%	60%	96.66%	93%
IF	TVS	40%	88.88%	28.57%	93.02%	84%
	SIS	50%	92.22%	41.66%	94.31%	88%
SF	TVS	50%	88.29%	21.42%	96.51%	86%
	SIS	66.66%	90.42%	30.76%	97.70%	89%

Polyp (P), Endometrial hyperplasia (H), Intramural fibroid (IF), Submucous fibroid (SF)

Table-4: shows the comparison of our results with other studies.

	Procedure	Sensitivity	Specificity	PPV	NPV
Saidi et al[8]	TVS	95.70%	63.30%	84.60%	12.50%
	SIS	90.90%	83.30%	90.90%	16.70%
Ryu JA et al[9]	TVS	79%	46%	83%	39%
	SIS	95%	83%	95%	83%
Present study	TVS	79.40%	75.80%	62.80%	87.70%
	SIS	82.40%	80.30%	68.30%	89.80%

diagnostic accuracy in detection of endometrial polyps by SIS.[11]

In our study, out of 13 submucous myomas detected by SIS, only four (30.8%) were confirmed by histopathology. Submucous myoma appeared as solid, less mobile echogenic mass which could be sessile or pedunculated. It showed some continuation with endometrium. Contrary to our findings of present study, Aslam et al (2004) carried a study over 348 women presenting with AUB . Out of 13 cases diagnosed as submucous myomas, 5 were misinterpreted as intramural myomas by TVS but were correctly reported by SIS in his results.[12]

In our study, SIS was 66.66 % sensitive, 90.42% specific with diagnostic accuracy of 89% in detecting submucous fibroid. Similarly for intramural fibroid SIS was found to be more accurate as compared to TVS (88% Vs 84%). The only disadvantage of SIS is that small irregularities caused by blood clots or endometrial protrusions were frequently misinterpreted as polyps or submucosal fibroid . This can be overcome by meticulous examination and proper distention of the cavity. Projections towards cavity in FIGO type one and two myomas might disappear due to marked distension of the cavity. So, the initial real time observation is very important while performing the procedure and requires expertise. Also due to small number of cases, it is difficult to draw a statistically significant conclusion here and leaves a scope to test this in more number of patients.

Thus TVS was unable to differentiate accurately between different intracavitary lesions. This problem was not faced by SIS as endometrial cavity gets distended and it permits single layer evaluation of endometrial lining. Also it enables the clinician to distinguish easily focal lesions from diffuse endometrial lesions. So SIS was found to be more sensitive and specific tool for prediction of abnormal uterine cavity. Overweight females have higher incidence of having abnormal bleeding pattern. TVS has quite essential role as the first diagnostic modality in patients presenting with abnormal uterine bleeding. Transvaginal sonography being non invasive and cost effective, bleeding episodes does not interfere with the test. It could easily diagnose normal endometrium, intramural myomas, submucous myomas .

But at times it could not delineate between hyperplasia and polyp. SIS has emerged as an extension of TVS. Procedure of visualizing uterine cavity after instillation of saline was found easy, comfortable and cost effective. It does not cause any obvious adverse effect in the patient. We found good acceptability and negligible post procedure complication with SIS. Normal findings on TVS reduces the intervention rate but fails to delineate particularly polyps.

CONCLUSION

We found that sensitivity and specificity of SIS in diagnosing intracavitory lesions is greater than TVS. Though TVS is less invasive than SIS, the diagnostic accuracy of SIS is more than TVS. Therefore SIS overcomes the fallacies of TVS and can be used as investigation of choice in OPD for evaluation of abnormal uterine bleeding.

However our study being small, larger controlled trials with larger group of patients are required.

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