

Diagnostic Accuracy of Saline Infusion Sonography in Abnormal Uterine Bleeding Perimenopausal Women

Lavanya Rachamalla, Harika Bhima*

Assistant Professor, Department Of Obstetrics and Gynaecology, Narayana Medical College and Hospital, Nellore, A.P, India

*Corresponding author: Dr. Harika Bhima

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Abstract

Aim: The study aimed to compare the efficacy of saline infusion sonohysterography (SIS) in investigation of abnormal uterine bleeding in perimenopausal women with transvaginal sonography (TVS) and histopathological examination of hysterectomy specimen. **Method:** The study was carried in 50 women with Abnormal uterine bleeding and were subjected to Transvaginal sonography, Saline infusion sonography and D and C for diagnosing underlying pathology of AUB. The comparative efficacy of TVS and SIS were correlated with HPE results from hysterectomy and the same identified as Gold standard. In the present study menorrhagia was the most common bleeding pattern. **Results:** Among 15 cases diagnosed as endometrial hyperplasia in TVS, 2 were found to have polyps using SIS. 1 case of endometrial hyperplasia was found to have irregular hyperplasia using SIS, which was suggestive of malignancy. TVS diagnosed 1 case of endometrial polyp as a submucous fibroid. SIS correctly diagnosed 10 cases of hyperplasia and 1 case of irregular hyperplasia suggestive of malignancy. 4 cases of polyps were diagnosed as endometrial hyperplasia in TVS and 1 case of adenocarcinoma as submucous fibroid. SIS diagnosed all polyps correctly and diagnosed 1 adenocarcinoma as irregular hyperplasia. **Conclusion:** The use of saline infusion sonohysterography to enhance the visualization of the endometrium increases the diagnostic accuracy of TVS to approach that of diagnostic hysteroscopy and may even replace it. It is an alternative to hysteroscopy with the additional advantage of evaluating Myometrial and adnexal pathology besides being less invasive and cost effective.

Keywords: Abnormal Uterine Bleeding, hyperplasia, saline infusion sonohysterography, transvaginal sonography.

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INTRODUCTION

Abnormal uterine bleeding is one of the most frequent menstrual problems. It includes heavy and or prolonged periods and any form of irregular bleeding per vaginum. Abnormal uterine bleeding is a symptom and not a disease. These menstrual aberrations occur at the extremes of reproductive life. Approximately 50% of women by the age of 46 years, 75% by the age of 48 years and 95% by the age of 51 years will experience menstrual abnormalities. Approximately 20% of patients presenting to a gynecologist have complaints of AUB.

There are number of causes of AUB. It is usually due to abnormalities of reproductive tract which may be benign (polyp, submucous fibroid, adhesions etc.) or malignant or it may be due to infection, pregnancy related complications, iatrogenic factors and systemic diseases. AUB warrants a thorough evaluation in post menopausal and perimenopausal women in order to rule out, serious pathology like

endometrial cancer and its precursors such as complex hyperplasia.

The idea of fractional curettage for all patients with perimenopausal and post menopausal abnormal uterine bleeding is now shifting towards hysteroscopy guided biopsy. Such sophisticated investigations demand greater technical skill and expertise which most patients cannot reach. Mere sonography can miss early malignancies & polyps. A simple modification of saline infusion sonohysterography [SIS], has become a handy tool, an alternative to hysteroscopy in the evaluation of abnormal uterine bleeding. The combination of sonohysterography and endometrial biopsy offers high sensitivity and negative predictive values for detection of endometrial uterine pathology in patients with abnormal bleeding.

Aim of the study is to compare the efficacy of saline infusion sonohysterography in investigation of abnormal uterine bleeding in perimenopausal women with transvaginal sonography and histopathological examination of hysterectomy specimen.

MATERIALS AND METHODS

The study was carried out from June 2017-August 2018, in the Department of Obstetrics and Gynecology, narayana medical college, nellore. 50 women with Abnormal uterine bleeding were selected on the basis of the following inclusion and exclusion criteria and were subjected to Transvaginal sonography, Saline infusion sonography and D and C for diagnosing underlying pathology of AUB. The comparative efficacy of TVS and SIS were correlated with HPE results from hysterectomy and the same identified as Gold standard.

Inclusion Criteria:

All women with Abnormal uterine bleeding above 40 years of age who are admitted for Hysterectomy

Exclusion Criteria:

- Unwilling patients
- Suspected pelvic infection
- Profusely bleeding patients requiring therapeutic curettage.
- Women on oral contraceptives
- Premalignant/ malignant lesions of cervix
- cervical stenosis

Procedure

50 patients were selected on the basis of inclusion and exclusion criteria Detailed history evaluated from them regarding duration of complaint, menstrual history, drug intake and other associated medical illness. Routine blood investigations and urine analysis were done. The selected patients underwent Transvaginal sonography and findings noted. The sagittal and coronal section of uterus viewed. Both adnexal viewed to find out any adnexal pathology also.

8 Fr Foleys catheter was inserted through the cervix into the endometrial cavity and bulb of the Foleys was inflated with 2ml of distilled water and positioned in the lower most portion of the endometrial cavity. Transvaginal probe introduced without disturbing the catheter and positioned in the posterior fornix posterior to the catheter. Under ultrasonic guidance about 10 ml of sterile normal saline was injected into the Foleys catheter. The uterine cavity distended with saline was carefully examined in the coronal plane from cornua to cornua and in the longitudinal plane from fundus to the cervix for any intraluminal pathology. Endometrial thickness surrounding the fluid was measured. If any polyp or intraluminal pathology was present, its position was noted and measured.

Normal findings of SIS:

The procedure is best done in proliferative phase when the endometrium is thin to facilitate detection of polyps Normal endometrial cavity should distend symmetrically, is well demarcated and surrounded by anechoic saline [1]. Homogenous single layer thickness of endometrial lining in relation to phase of menstrual cycle can be visualized. Fluid in culdesac indicates patent fallopian tubes [2].

Abnormal findings in SIS:

- Endometrial polyps appear as echogenic protrusions into the cavity and move characteristically upon injecting saline [3]. This movement differentiates the polyps from blood clots which can be displaced anywhere in the cavity.
- Intracavitary & sub mucous fibroids appear as filling defects with mixed echogenicity that is different to the endometrium with which they are usually covered [4]. Extension of fibroids up to serosal surface of uterus has to be noted as resection of fibroids should not be attempted in these cases.
- Focal endometrial thickening: Endometrial thickness of each wall is measured separately identifying focal thickening [5]. This will later guide biopsy at hysteroscopy. Irregularity in the surface of endometrium, heterogeneity of the endometrium, irregularity of the junction between the endometrium and the myometrium and uniform increased echogenicity of the endometrium all raise the suspicion of malignancy.
- Abnormalities of uterine cavity: Intrauterine adhesions and malformations of uterine cavity appear as immobile connections between the uterine wall. If adhesions are thick and wide spread, distension of the cavity will be difficult. Incomplete separation of the anterior and posterior uterine walls, in longitudinal sections of the uterus denotes intrauterine synechiae and can give the uterus a bow tie appearance on transverse sections. Malformations of the uterine cavity could cause much thicker connections between the anterior and posterior walls.
- Endometrial atrophy.

RESULTS

Majority of patients who presented with AUB were between 40-45 yrs of age. Highest incidence of AUB in our study was among Para 2 (40%) followed by Para 3 (32.72%). In the present study menorrhagia was the most common bleeding pattern 31 (56%) followed by metrorrhagia 6 (11%) and polymenorrhoea 6 (11%).

SIS was able to detect 5 cases of endometrial polyps compared to 1 case in TVS.

Table-1: Comparison of Transvaginal Sonographic Findings with That of SIS

TVS		SIS					
		Normal	Hyperplasia	Irregular Hyperplasia	Polyp	SMF	IMF
Normal	18	17			1		
Hyperplasia	15	1	11	1	2		
Polyp	1				1		
SMF	4				1	3	
Intramural fibroid	17						17

Among 15 cases diagnosed as endometrial hyperplasia in TVS, 2 were found to have polyps using SIS. 1 case of endometrial hyperplasia was found to

have irregular hyperplasia using SIS, which was suggestive of malignancy. TVS diagnosed 1 case of endometrial polyp as a submucous fibroid.

Table-2: Comparison of SIS with Hysterectomy (n=50)

SIS		Hysterectomy					
		Normal	Polyp	Hyperplasia	Adenocarcinoma	SMF	IMF
Normal	13	12	1				
Polyp	5	1	4				
Hyperplasia	12	1		10	1		
SMF	3					3	
IMF	17						17

SIS was able to detect correctly 4 cases of polyp among 5 cases confirmed by hysterectomy. SIS over diagnosed 1 case of polyp which turned out to be

normal study in hysterectomy specimen. SIS correctly diagnosed 10 cases of hyperplasia and 1 case of irregular hyperplasia suggestive of malignancy.

Table-3: Comparison of Findings of Transvaginal Sonography, SIS and Hysterectomy (n=50)

Findings	TVS	SIS	Hysterectomy
Normal	13	13	14
Hyperplasia	15	12	10
Polyp	1	5	5
SMF	4	3	3
Adenocarcinoma			1
Intramural fibroid	17	17	17

4 cases of polyps were diagnosed as endometrial hyperplasia in TVS and 1 case of adenocarcinoma as submucous fibroid. SIS diagnosed

all polyps correctly and diagnosed 1 adenocarcinoma as irregular hyperplasia.

Table-4: Comparison of SIS with Hysterectomy in Abnormal Cavity Findings

SIS	Hysterectomy		Total
	Positives	Negatives	
Positives	18	2	20
Negatives	1	29	30
Total	19	31	50
Parameter			Estimate
Sensitivity			94.7%
Specificity			93.5%
Positive predictive value			90%
Negative predictive value			96.7%
Diagnostic accuracy			88.6%
Likelihood ratio of a positive test			14.56
Likelihood ratio of a negative test			0.05
Cohen's kappa(Unweighted)			0.87

SIS has a kappa measure of agreement of 0.87 which is statically highly significant.

DISCUSSION

This prospective, descriptive and comparative study analyzing the diagnostic accuracy of saline

infusion sonohysterography in women with abnormal uterine bleeding is undertaken in 55 patients.

TVS: Abnormal findings like polyp, hyperplasia, submucous fibroid and intramural fibroid were noted in 37 patients (67.27%) while the remaining 18 patients (32%) had normal findings consistent to their age. 3 Patients were correctly diagnosed as submucous fibroid but 1 patient with a polyp was wrongly diagnosed as a case of submucous fibroid (accuracy 98%). It correctly arrived at a diagnosis of endometrial hyperplasia in 10 cases (accuracy 90%) but could not differentiate between a polyp and hyperplasia in 1 case. One case of adenocarcinoma was also labeled as hyperplasia. There was also an over diagnosis of hyperplasia in 3 normal cases. Transvaginal sonogram was able to demonstrate uterine abnormalities but an accurate pathological diagnosis was not possible in most cases. These values are comparable with other reports in the literature such as:

Study	Sensitivity	Specificity
Saidi <i>et al.</i> , [6]	95%	65%
Gaucherand <i>et al.</i> , [7]	77%	93%
Schwarzlr <i>et al.</i> , [8]	67%	89%
Pasrija S <i>et al.</i> , [9]	84.8%	94.4%
Parsanezhad <i>et al.</i> , [10]	72%	92%
Reddi Rani P <i>et al.</i> , [11]	65.6%	88%
Present study	89.5%	90.3%

Saline Infusion Sonography

68% of the patients were found to have some abnormality such as polyp, hyperplasia, submucous fibroid and Intramural fibroid. 32% of the patients had normal findings. SIS was able to detect correctly 4 cases of polyps among 5 cases detected by hysterectomy (96% accuracy). SIS correctly diagnosed 11 cases of hyperplasia including 1 case of irregular hyperplasia, suggestive of malignancy. (96% accuracy) Though correct diagnosis was not possible in the case of adenocarcinoma it had presented as irregularly hyperplasia which warranted further evaluation, thus helping in arriving at final diagnosis and avoiding false negative report. In our study saline infusion sonography showed an overall sensitivity of 94.7% and specificity of 93.5% in the detection of abnormal uterine findings with positive predictive value of 90% and negative predictive value of 96.7%. These values are comparable with other reports in the literature such as-

Study	Sensitivity	Specificity	PPV	NPV
Gaucherand <i>et al.</i> , [7]	94%	98%	91%	99%
Schwarzler <i>et al.</i> , [8]	87%	91%	92%	85%
Pasrija S <i>et al.</i> , [9]	94.1%	88.5%	91.4%	92%
Parsanezhad [10]	94.1%	95%	96%	90%
Reddi Rani P <i>et al.</i> , [11]	82%	95%	81%	93%
Present study	94.7%	93.5%	90%	96.7%

On comparison with the above literature, in our study the overall sensitivity of TVS improved after saline enhancement from 89.5% to 94.7%, specificity from 90.63% to 93.5%, positive predictive value increased from 85% to 90% and negative predictive value from 93.3% to 96.7%.

CONCLUSION

Saline infusion sonohysterography (SIS) is a safe, simple and minimally invasive procedure with a low incidence of minor complications and no major complications. SIS gives a higher percentage of correct diagnosis than when TVS is used alone. SIS may be most useful in the diagnosis of focal lesions such as polyps. The use of saline infusion sonohysterography to enhance the visualization of the endometrium increases the diagnostic accuracy of TVS to approach that of diagnostic hysteroscopy and may even replace it. It is an alternative to hysteroscopy with the additional advantage of evaluating Myometrial and adnexal pathology besides being less invasive and cost effective.

LIMITATIONS

The sample size in the present study is small.

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