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Evaluation of Accuracy of Saline Infusion Sonohysterography with Endometrial Pathology in Patients with Postmenopausal Bleeding

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Abstract: ***Introduction: If a woman is having no menstruation for a period of consecutive 12 months in the perimenopausal age, then she is considered to be in menopause. Postmenopausal bleeding occurs in a woman after she has undergone menopause. Postmenopausal bleeding can be caused by a variety of abnormalities of uterus, so it should be evaluated and treated. Test available to diagnose cause of PMB include Dilatation and Curettage, endometrial biopsy, hysteroscopy, trans vaginal ultrasound, saline infusion sonography etc. Aims and Objectives: To evaluate the accuracy of Saline infusion sonography and Transvaginal sonography in patients with Postmenopausal bleeding.To study the difference in accuracy of Saline infusion sonography and Transvaginal sonography in patients with Postmenopausal bleeding. Methodology: Study Design: Prospective study. Study population: The study is to be conducted at the obstetrics and gynaecology department in Jubilee Mission Medical College, Thrissur. Results & Conclusion: Saline infusion sonography showed better prediction of endometrial hyperplasia and submucosal fibroid. Sensitivity and specificity were higher in SIS when compared to TVS's predictions in identifying polyp. However, specificity and positive predictive values were slightly higher in TVS group. The sensitivity of both tests was similar for identifying intramural fibroid; however, rest of the test predictions were higher in SIS when compared to TVS's predictions in identifying intramural fibroid. The test predictions were similar in SIS and TVS's predictions in identifying carcinoma endometrium.***

Keywords: Transvaginal sonography: Saline infused sonography

1. Introduction

Postmenopausal bleeding is a serious and not uncommon gynaecological problem that needs evaluation to rule out endometrial carcinoma. The average age of menopause is fifty-one years.[1] The level of the follicle-stimulating hormone is elevated after menopause, as the hypothalamic-pituitary-ovarian axis attempts to stimulate ovulation despite the ovaries no longer being able. It is defined as the uterine bleeding occurring for more than 12 months after the last menstrual period of a menopausal women. After a woman is postmenopausal, further vaginal bleeding is no longer considered normal. The differential diagnosis of postmenopausal bleeding includes many benign and malignant conditions, the most common of which is atrophy, but the most concerning possible aetiology is endometrial cancer. As with most malignancies, early diagnosis may lead to a better prognosis.[2]

Studies have indicated the incidence of malignancy in such patients ranging from 1% to 14%.[3] Other potential causes of bleeding are cervical cancer, cervicitis, atrophic vaginitis, endometrial atrophy, submucous fibroids, endometrial hyperplasia, and endometrial polyps.[4] The American College of Obstetricians and Gynaecologists has opined that in postmenopausal women with bleeding, when present, "a thin distinct endometrial echo on transvaginal ultrasonography of 4 mm or less has a risk of malignancy of 1 in 917 and therefore endometrial biopsy is not required".[5] The most likely diagnosis in such cases is an atrophic endometrium. Transvaginal sonography (TVS) plays an important role as the initial modality for the evaluation of postmenopausal bleeding. Focal lesions such as polyps and submucous fibroids are underdiagnosed at TVS because of limitations of the double layer thickness evaluation.[6] Transvaginal ultrasonography (TVS) is highly applicable, non-invasive and preferred initially in the evaluation of women with AUB.[6] However, the accuracy of TVS is limited in the diagnosis of focal endometrial lesions. This can be overcome by saline infusion sonohysterography (SIS), which can be performed easily and rapidly and is well tolerated by patients.[7,8] Hysteroscopy is an effective procedure but more expensive than SIS. Direct visualization of the uterine cavity is possible by hysteroscopy but it does not give any information about myometrium and adnexa.

The idea of fractional curettage for all patients with perimenopausal and post-menopausal abnormal uterine bleeding is now shifting towards hysteroscopic guided biopsy. Such sophisticated investigations demand greater technical skill and expertise which is not within the reach of most patients. Plain transvaginal sonography can miss early malignancies and polyps. A simple modification by saline infusion sonohysterography (SIS), has become a less invasive alternative to hysteroscopy in the evaluation of abnormal uterine bleeding.[9] SIS can rule out malignancy with 100% sensitivity, but to confirm malignancy, further biopsy and histopathology are mandatory. Previous study revealed that the sensitivity and specificity of SIS in diagnosis of intracavitary lesions in patients with infertility

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were 84.3% and 75% respectively.[10] Hysteroscopy was superior on SIS in the diagnosis of intrauterine adhesions and Mullerian anomalies in a cohort of 104 infertile women.[10] The combination of sonohysterography and endometrial biopsy offers high sensitivity and negative predictive values for detection of endometrial and uterine pathology in patients with abnormal uterine bleeding.[11,12] The use of saline infusion sonohysterography reduces the need for unnecessary surgical interventions.[13] It helps to differentiate endometrial, submucous and intracavitary lesions without using contrast agents.[14]

Studies have shown that there is a significant difference in the accuracy of TVS and SIS in detection of endometrial pathologies. Our study aims to find out the accuracies of TVS and SIS for detection of uterine cavity abnormalities in patients with postmenopausal bleeding.

2. Methodology

Study Design: Diagnostic test evaluation

Study Period: 20 months

Setting: The study is conducted at the obstetrics and gynaecology department in Jubilee Mission Medical College, Thrissur.

Sampling: Purposive sampling

Sample Size: Based on the sensitivity of SIS and TVS observed in an earlier publication "*Goyal AS et al.Int J Reprod Contracept Obstet Gynecol.2016 May; 5(5):1566-1570*" [(11)], with >95% confidence level and <15% relative allowable error minimum sample size comes to 50

Inclusion Criteria:
- Menopausal women presenting with bleeding
- Patients not had any endometrial biopsies in the previous 2 months

Exclusion Criteria:
- Patients with active pelvic inflammatory diseases, known genital tract malignancies, adnexal masses and cervical pathology
- Surgical menopause patients

3. Methods of Data Collection

Women who fulfil the inclusion criteria was selected till the required number of sample size. The aim and objectives of the study was explained in detail to the subjects and their written informed consent was taken. Trans vaginal sonography was performed by a radiologist to look for endometrial thickness and any other focal pathology was looked for. Saline infusion sonography was performed on the next day. Under all aseptic precautions, a sterile Sim's speculum was introduced in to the posterior vaginal wall and anterior lip of cervix was held with a volsellum. Foley's catheter no.8 is advanced through external os in to the endometrial cavity and then balloon inflated. The speculum is then removed from vagina and endo vaginal probe is inserted inside. Under direct sonographic visualization, the balloon was gently retracted to occlude the internal cervical os and 15-20 ml saline injected in to the endometrial cavity. The anechoic fluid juxtaposed against echogenic endometrium was give details of uterine lining. Complete sonographic evaluation of the endometrial cavity was performed. Balloon was deflated. Lower uterine segment and endo cervical region was examined followed by catheter removal. Results of the TVS and SIS was compared using sensitivity, specificity, Positive predictive value and Negative predictive value.

Table 1: Endometrial Hyperplasia in SIS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Saline Infusion sonography	Absent	26 TN	03 FN	29
	Present	04 FP	17 TP	21
Total		30	20	50
Chi-square test value: 25.301 (d.f 1); p <0.001				
Test prediction for SIS *for endometrial hyperplasia*		%	95% Confidence Interval	
Sensitivity		85.00%	62.11% to 96.79%	
Specificity		86.67%	69.28% to 96.24%	
Positive predictive value		80.95%	62.63% to 91.51%	
Negative predictive value		89.66%	75.15% to 96.13%	

4. Results

Saline Infusion Sonography Prediction

The histopathology was taken as gold standard for analysis. The SIS's predictability of endometrial hyperplasia showed that it had a sensitivity of 85%; meaning it has 85 % accuracy in predicting positive cases. The specificity of SIS for endometrial hyperplasia was 86.7%.Meaning its ability to identify all those who don't have endometrial hyperplasia. This table prediction was statistically significant with p vale < 0.001. The SIS's predictability of polyp showed that it had a sensitivity of 100%; meaning it has 100% accuracy in predicting positive cases. The specificity of SIS for polyp was 94.87%. Meaning its ability to identify all those who don't have polyp. This table prediction was statistically significant with p vale < 0.001.

Table 2: Polyp in SIS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Saline infusion sonography	Absent	37 TN	00 FN	43
	Present	02 FP	11 TP	13
Total		30	20	50
Chi-square test value: 40.1 (d.f 1); p <0.001				
Test prediction for SIS *for Polyps*		%	95% Confidence Interval	
Sensitivity		100.00%	71.51% to 100.00%	
Specificity		94.87%	82.68% to 99.37%	
Positive predictive value		84.62%	58.78% to 95.50%	
Negative predictive value		100.00%	-	

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The SIS's predictability of submucosal fibroid showed that it had a sensitivity of 100%; meaning it has 100% accuracy in predicting positive cases. The specificity of SIS for submucosal fibroid was 95.65%. Meaning its ability to identify all those who don't have submucosal fibroid. This table prediction was statistically significant with p vale < 0.001.

Table 3: Submucosal Fibroid in SIS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Saline infusion sonography	Absent	44 TN	00 FN	44
	Present	02 FP	04 TP	06
Total		46	04	50
Chi-square test value: 31.884 (d.f 1); p <0.001				
Test prediction for SIS *for submucosal fibroid*		%	95% Confidence Interval	
Sensitivity		100.00%	39.76% to 100.00%	
Specificity		95.65%	85.16% to 99.47%	
Positive predictive value		66.67%	34.02% to 88.58%	
Negative predictive value		100.00%	-	

The SIS's predictability of intramural fibroid showed that it had a sensitivity of 75%; meaning it has 75% accuracy in predicting positive cases. The specificity of SIS for intramural fibroid was 100%. meaning its ability to identify all those who don't have intramural fibroid. This table prediction was statistically significant with p vale < 0.001.

Table 4: Intramural Fibroid in SIS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Saline infusion sonography	Absent	42 TN	02 FN	44
	Present	00 FP	06 TP	06
Total		42	08	50
Chi-square test value: 35.795 (d.f 1); p <0.001				
Test prediction for SIS *for intramural fibroid*		%	95% Confidence Interval	
Sensitivity		75.00%	34.91% to 96.81%	
Specificity		100.00%	91.59% to 100.00%	
Positive predictive value		100.00%	-	
Negative predictive value		95.45%	86.35% to 98.59%	

The SIS's predictability of endometrial carcinoma showed that it had a sensitivity of 42.8%; meaning it has 42.8% accuracy in predicting positive cases. The specificity of SIS for endometrial carcinoma was 100%. meaning its ability to identify all those who don't have endometrial carcinoma. This table prediction was statistically significant with p vale < 0.001

Table 5: Carcinoma Endometrium in SIS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Saline infusion sonography	Absent	43 TN	04 FN	47
	Present	00 FP	03 TP	03
Total		43	07	50
Chi-square test value: 19.605 (d.f 1); p <0.001				
Test prediction for SIS *for carcinoma endometrium*		%	95% Confidence Interval	
Sensitivity		42.86%	9.90% to 81.59%	
Specificity		100.00%	91.78% to 100.00%	
Positive predictive value		100.00%	-	
Negative predictive value		91.49%	84.98% to 95.33%	

Transvaginal Sonography Prediction

Table 6: Endometrial Hyperplasia in TVS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Transvaginal scan	Absent	25 TN	04 FN	29
	Present	05 FP	16 TP	21
Total		30	20	50
Chi-square test value: 25.301 (d.f 1); p <0.001				
Test prediction for TVS for endometrial hyperplasia		%	95% Confidence Interval	
Sensitivity		80.00%	56.34% to 94.27%	
Specificity		83.33%	65.28% to 94.36%	
Positive predictive value		76.19%	58.26% to 88.00%	
Negative predictive value		86.21%	71.94% to 93.84%	

The histopathology was taken as gold standard for analysis. The TVS's predictability of endometrial hyperplasia showed that it had a sensitivity of 80%; meaning it has 80 % accuracy in predicting positive cases. The specificity of TVS for endometrial hyperplasia was 83.3%. meaning its ability to identify all those who don't have endometrial hyperplasia. This table prediction was statistically significant with p vale < 0.001.

The TVS's predictability of polyp showed that it had a sensitivity of 54.5%; meaning it has 54.5% accuracy in predicting positive cases. The specificity of TVS for polyp was 97.4%. meaning its ability to identify all those who don't have polyp. This table prediction was statistically significant with p vale < 0.001.

Table 7: Polyp in TVS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Transvaginal scan	Absent	38 TN	05 FN	43
	Present	01 FP	06 TP	07
Total		39	11	50
Chi-square test value: 19.256 (d.f 1); p <0.001				
Test prediction for TVS for Polyps		%	95% Confidence Interval	
Sensitivity		54.55%	23.38% to 83.25%	
Specificity		97.44%	86.52% to 99.94%	
Positive predictive value		85.71%	44.60% to 97.81%	
Negative predictive value		88.37%	79.88% to 93.57%	

The TVS's predictability of submucosal fibroid showed that it had a sensitivity of 75%; meaning it has 75% accuracy in predicting positive cases. The specificity of TVS for submucosal fibroid was 91.3%. meaning its ability to identify all those who don't have submucosal fibroid. This

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table prediction was statistically significant with p vale < 0.001.

Table 8: Submucosal Fibroid in TVS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Transvaginal scan	Absent	42 TN	01 FN	43
	Present	04 FP	03 TP	07
Total		46	04	50
Chi-square test value: 13.437 (d.f 1); p <0.001				
Test prediction for TVS for submucosal fibroid		%	95% Confidence Interval	
Sensitivity		75.00%	19.41% to 99.37%	
Specificity		91.30%	79.21% to 97.58%	
Positive predictive value		42.86%	20.07% to 69.13%	
Negative predictive value		97.67%	88.47% to 99.57%	

The TVS's predictability of intramural fibroid showed that it had a sensitivity of 75%; meaning it has 75% accuracy in predicting positive cases. The specificity of TVS for intramural fibroid was 92.8 %. meaning its ability to identify all those who don't have intramural fibroid. This table prediction was statistically significant with p vale < 0.001.

Table 9: Intramural Fibroid in TVS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Transvaginal scan	Absent	39 TN	02 FN	41
	Present	03 FP	06 TP	09
Total		42	08	50
Chi-square test value: 20.964 (d.f 1); p <0.001				
Test prediction for TVS for intramural fibroid		%	95% Confidence Interval	
Sensitivity		75.00%	34.91% to 96.81%	
Specificity		92.86%	80.52% to 98.50%	
Positive predictive value		66.67%	38.50% to 86.47%	
Negative predictive value		95.12%	85.41% to 98.48%	

The TVS's predictability of endometrial carcinoma showed that it had a sensitivity of 42.8%; meaning it has 42.8% accuracy in predicting positive cases. The specificity of TVS for endometrial carcinoma was 100 %. meaning its ability to identify all those who don't have endometrial carcinoma. This table prediction was statistically significant with p vale < 0.001.

Table 10: Carcinoma Endometrium in TVS and Histopathology

		On Histopathology Report		Total
		Absent	Present	
On Transvaginal scan	Absent	43 TN	04 FN	47
	Present	00 FP	03 TP	03
Total		43	07	50
Chi-square test value: 19.605 (d.f 1); p <0.001				
Test prediction for TVS for carcinoma endometrium		%	95% Confidence Interval	
Sensitivity		42.86%	9.90% to 81.59%	
Specificity		100.00%	91.78% to 100.00%	
Positive predictive value		100.00%	-	
Negative predictive value		91.49%	84.98% to 95.33%	

Comparison of SIS & TVS

Comparison of SIS and TVS's prediction on Endometrial hyperplasia

All the test predictions were higher in SIS when compared to TVS's predictions in identifying endometrial hyperplasia.

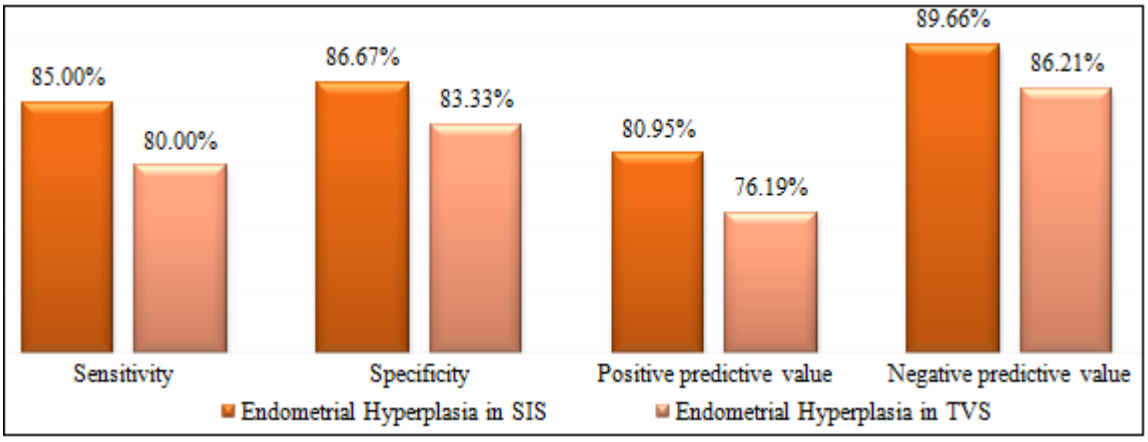

Figure 1: Predictions for endometrial hyperplasia

Comparison of SIS and TVS's prediction on Polyps

Sensitivity and specificity were higher in SIS when compared to TVS's predictions in identifying polyp. However, specificity and positive predictive values were slightly higher in TVS group.

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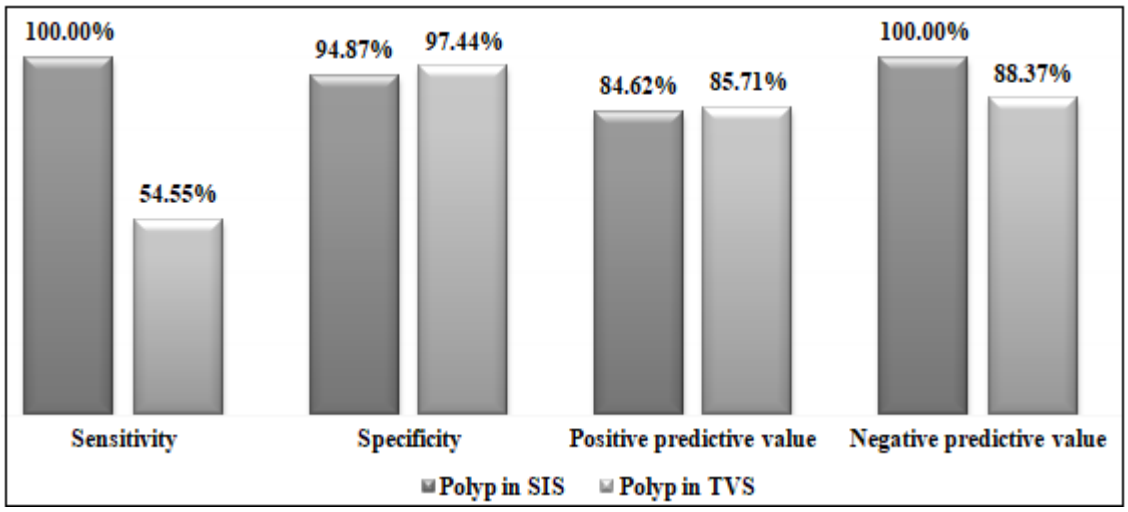

Figure 2: Predictions for polyps

Comparison of SIS and TVS's prediction on Submucosal Fibroid

All the test predictions were higher in SIS when compared to TVS's predictions in identifying submucosal fibroid.

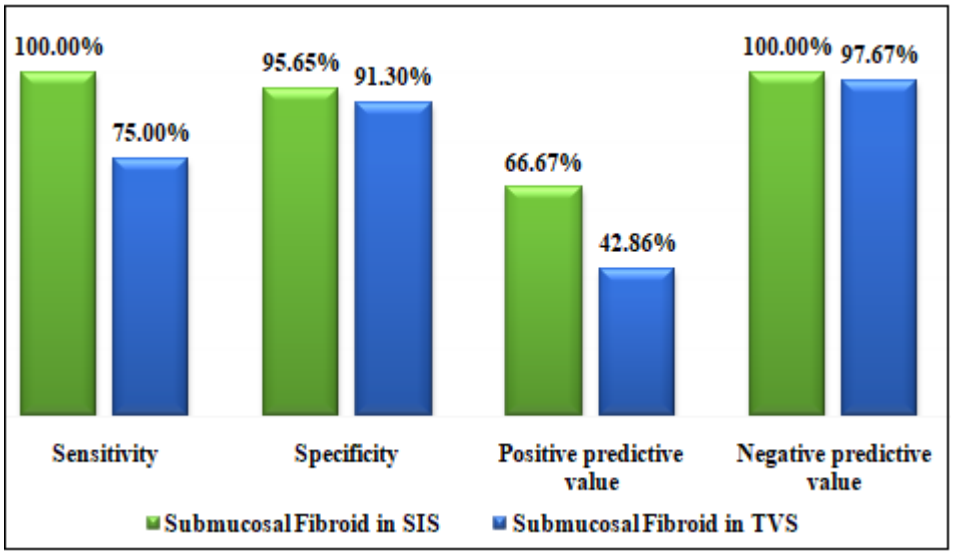

Figure 3: Predictions for submucosal fibroid

Comparison of SIS and TVS's prediction on Intramural Fibroid

The sensitivity of both tests was similar for identifying intramural fibroid; however, rest of the test predictions were higher in SIS when compared to TVS's predictions in identifying intramural fibroid.

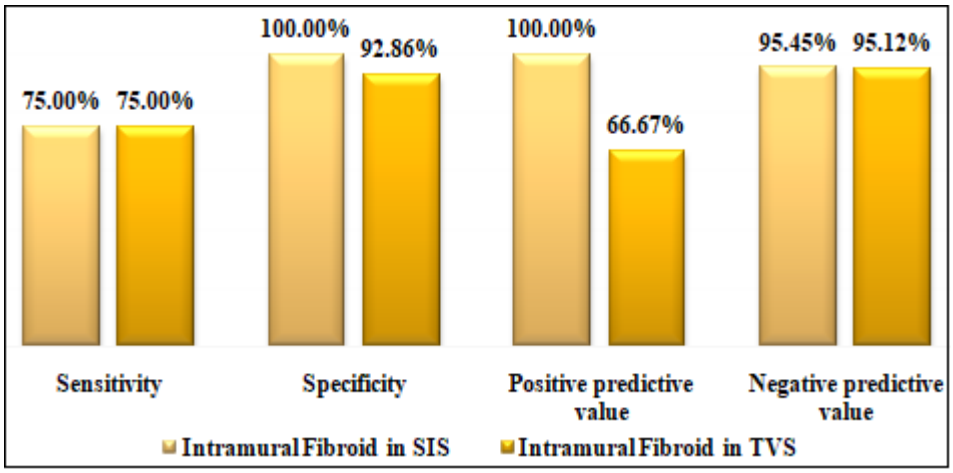

Figure 4: Predictions for intramural fibroid

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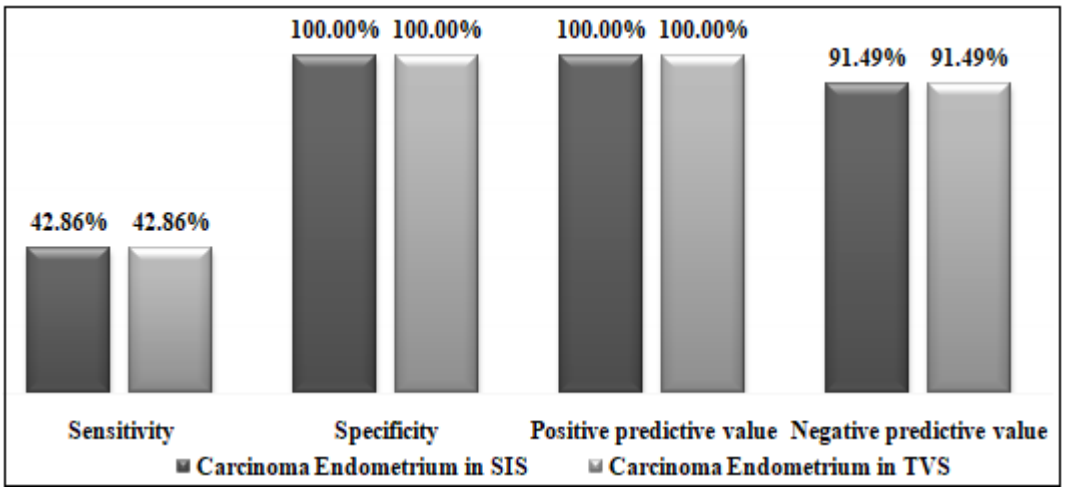

Figure 5: Predictions for Ca endometrium

Table 11: Comparison of findings

	SIS		TVS		Histopathology	
Pathology	n	%	n	%	n	%
Endometrial hyperplasia	18	36.0	17	34.0	16	32.0
Endometrial polyp	13	26.0	07	14.0	11	22.0
Intramural fibroid	06	12.0	09	18.0	08	16.0
Submucous fibroid	06	12.0	07	14.0	03	06.0
Ca Endometrium	03	06.0	03	06.0	07	14.0

The SIS's predictability of endometrial hyperplasia showed that it had a sensitivity of 85%, specificity of 86.7%, PPV 80.9% and NPV 89.6%. While TVS's predictability was lower for endometrial hyperplasia with sensitivity of 80%, but higher specificity of 83.3%, Lower PPV 76.2% and NPV 86.2%. The SIS's predictability of polyp showed that it had a sensitivity of 100%, specificity of 94.87%, PPV 84.6% and NPV 100%. While TVS's predictability was lower for endometrial polyp with sensitivity of just 54.5%, but higher specificity of 97.4%, higher PPV of 85.7% and lower NPV 88.3%. The SIS's predictability of intramural fibroid showed that it had a sensitivity of 75%, specificity of 100%, PPV 100% and NPV 95.4%. While TVS's predictability was lower for intramural fibroid with sensitivity of 75%, but lower specificity of 92.8%, lower PPV of 66.6% and lower NPV 95.2%. The SIS's predictability of submucosal fibroid showed that it had a sensitivity of 100%, specificity of 95.6%, PPV 66.7% and NPV 100%. While TVS's predictability was lower for submucosal fibroid with sensitivity of 75%, lower specificity of 91.3%, lower PPV of 42.8% and lower NPV 97.6%. The SIS's predictability of endometrial carcinoma showed that it had a sensitivity of 42.8%, specificity of 100%, PPV 100% and NPV 91.4%. While TVS's predictability of endometrial carcinoma had similar sensitivity of 42.8%, specificity of 100%, PPV 100% and NPV 91.4%.

5. Discussion

In our study half of the patients with postmenopausal bleeding between 51 to 60 years and the mean age of the study population was 61 years. Which was similar in other studies by Karthikeyan et al.[95] was 88% patients belonged to 40 to 50 years. Only 12%were in 51- 55 years age group. In a study by Valenzano et al.[96], 64% were of median age 38.9 years, 35.6 % were in median age of 60.5 years. In this study socioeconomic status showed that most of our study patients belonged to low socioeconomic status; which was similar to the study by Nallapti et al.[97]

The SIS's predictability of endometrial hyperplasia showed that it had a sensitivity of 85%, specificity of 86.7%, PPV 80.9% and NPV 89.6%. While TVS's predictability was lower for endometrial hyperplasia with sensitivity of 80%, but higher specificity of 83.3%, Lower PPV 76.2% and NPV 86.2%. The reviewed study by Nallapati et al.[97] showed SIS with sensitivity of 100% & specificity of 94% for endometrial hyperplasia. Similarly, Rudra et al.[98] showed sensitivity of 97.9% & specificity of 100% for endometrial hyperplasia. Dasgupta et al.[99] showed sensitivity of 97.9% & specificity of 100% for endometrial hyperplasia. The reviewed studies showed higher level of predictability for endometrial hyperplasia.

The SIS's predictability of polyp showed that it had a sensitivity of 100%, specificity of 94.87%, PPV 84.6% and NPV 100%. While TVS's predictability was lower for endometrial polyp with sensitivity of just 54.5%, but higher specificity of 97.4%, higher PPV of 85.7% and lower NPV 88.3%. The reviewed study by Chawla et al.[100], polyp was the most common finding (51.7 %). Polyps were the most prevalent lesion in studies by Feitosa et al.[101] and El-khayat et al.[102] (33.3 and 26 %, respectively). In the present study, sensitivity and specificity of SIS were 80.64 and 100 % for polyps compared to 29.35 and 100 % for TVS, respectively, implying that the detection rate of polyp increased significantly on addition of SIS to TVS. In a similar study by Schwarzler et al.[103] on 104 patients, the detection rate of polyp went up from 56 to 84 % on SIS. They also observed that SIS decreased the number of false-negative results from 11 to 4 without increasing the number of false-positive results. Specificity of both TVS and SIS was found to be 100 % in detection of endometrial polyp in the present study. In a study by Yildizhan et al.[104], the sensitivity and specificity of TVS in detecting endometrial polyp were 65.2 and 87.9 %, respectively, compared with 91.3 and 93.1 % for SIS.

In our study the SIS's predictability of intramural fibroid showed that it had a sensitivity of 75%, specificity of 100%, PPV 100% and NPV 95.4%. While TVS's predictability was

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lower for intramural fibroid with sensitivity of 75%, but lower specificity of 92.8%, lower PPV of 66.6% and lower NPV 95.2%. The SIS's predictability of submucosal fibroid showed that it had a sensitivity of 100%, specificity of 95.6%, PPV 66.7% and NPV 100%. While TVS's predictability was lower for submucosal fibroid with sensitivity of 75%, lower specificity of 91.3%, lower PPV of 42.8% and lower NPV 97.6%. The reviewed studies by study by Nallapati et al.[97] showed SIS with sensitivity of 86.3% & specificity of 83% for submucosal fibroid. Similarly, Rudra et al.[98] showed sensitivity of 97.3% & specificity of 88.2% for submucosal fibroid. Dasgupta et al.[99] showed sensitivity of 98.7% & specificity of 85.7% for submucosal fibroid. Btosis et al.[105] showed a sensitivity of 99% and specificity of 88%. The reviewed studies showed lower level of predictability for submucosal fibroid.The sensitivity of SIS was 75 % for submucous myoma, while the specificity was 69.23 %, and no case of myoma was diagnosed accurately on TVS. Riko et al.[106] in a study concluded that SIS findings were consistent with hysteroscopy in 97.5 % of patients with submucous myoma.

In the study by Chawla et al.[100] both SIS and TVS have been found to have high sensitivity (100 and 66.6 %, respectively) for endometrial hyperplasia; however, SIS was more specific than TVS (100 vs 20 %, respectively). Mohammad et al.[93] reported sensitivity of 73.35, 71.4, and 91.95 % for polyp, hyperplasia, and submucous myoma, respectively, whereas the specificity was 96 % for polyps, 82.3 % for hyperplasia, and 90.7 % for submucous myoma on SIS. Feitosa et al.[107] reported the sensitivity and specificity of TVS in diagnosis of abnormal findings in patients of AUB as 83.3 and 83.3 %, respectively. SIS combined with TVS showed more accuracy in detection of lesions in uterine cavity in the present study. Sensitivity, specificity, PPV, and NPV of SIS in detecting abnormal lesion were 89.1, 100, 100, and 73.7 %, respectively. Erdem et al.[108] analyzed 122 women with AUB and found that SIS had sensitivity of 97.7 % and specificity of 82.45 %, while TVS demonstrated sensitivity of 83.5 % and specificity of 70.6 %. Karsidag et al.[109] in a study on postmenopausal women demonstrated that TVS had sensitivity of 63 %, specificity 78 %, PPV 89 %, and NPV of 41 %. They found the sensitivity, specificity, PPV, and NPV to be 93, 56, 86, and 71 %, respectively, for SIS. Thus, most other studies have also found SIS to be a better test.

6. Conclusion

Saline infusion sonography showed better prediction of endometrial hyperplasia and submucosal fibroid. Sensitivity and specificity were higher in SIS when compared to TVS's predictions in identifying polyp. However, specificity and positive predictive values were slightly higher in TVS group. The sensitivity of both tests was similar for identifying intramural fibroid; however, rest of the test predictions were higher in SIS when compared to TVS's predictions in identifying intramural fibroid. The test predictions were similar in SIS and TVS's predictions in identifying carcinoma endometrium.

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