



ORIGINAL RESEARCH PAPER

Radiodiagnosis

“ROLE OF SALINE INFUSED SONOHYSTEROGRAPHY IN EVALUATION OF INFERTILITY”

KEY WORDS:

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ABSTRACT

Aims & Objectives of Study: To document and study the accuracy of saline infused sonohysterosalpingography (SIS) for endometrial and tubal pathologies in infertility and to correlate the findings with hysteroscopy and hysterosalpingography.

Materials and methods: Fifty patients with infertility were subjected to SIS (TOSHIBA APLIO-500; 5-7.5 MHz linear transducer). Both endometrial pathologies and tubal patency were recorded. The findings were correlated with hysteroscopy/hysterosalpingography.

Results: Out of these 50 infertility cases 40% had tubal blockage, 32% were diagnosed with endometrial pathology & 10% were having both endometrial and tubal pathology while 18% patients were normal. Sensitivity, specificity, PPV, NPV & accuracy of SIS for assessing tubal patency were found to be 95.00%, 96.67%, 95.00%, 96.67% and 96 % respectively in this study. The sensitivity, specificity, PPV, NPV and accuracy of SIS for endometrial pathology were found to be 92.85%, 91.67%, 81.25%, 97.05% and 92 % respectively in this study which is far superior to TVS and comparable with hysteroscopy.

Conclusion: The diagnostic accuracy of the SIS is comparable with hysteroscopy and hysterosalpingography along with it provides advantage of being non-invasive, having minimal pain and trauma compared to hysteroscopy and hysterosalpingography. Though TVS is baseline investigation of infertility it is not an adequate test for assessment of intrauterine pathology, moreover TVS cannot assess tubal patency.

INTRODUCTION:

Infertility is defined as the inability of a couple to conceive after 1 year of regular unprotected intercourse. It is estimated that 10-15 % of eligible couples are infertile out of which 40% causes are attributed to women. The various pelvic causes of female infertility can range from uterine, tubal, cervical and ovarian disorders. Both tubal and uterine disorders are leading causes of infertility. Though Hysterosalpingography is gold standard for evaluating tubal pathology but it is less informative and inconclusive about endometrial pathology and also exposes patients to harmful radiations. Saline infused Sonohysterography (SIS) is a simple, safe and well tolerated procedure with low complications and clarity of images are comparable to that of MRI. SIS involves the instillation of sterile saline in endometrial cavity under transvaginal sonographic visualisation, the saline inflates the endometrial cavity and provides anechoic interface for better visualisation of endometrial cavity. Tubal patency can be indirectly assessed by collection of saline in cul-de-sac. It is much less invasive than Hysteroscopy and can be done in OPD basis. The primary aim of this study was to evaluate the role of saline infused sonohysterosalpingography in evaluation of infertility and to assess the diagnostic performance of this modality correlated with hysterosalpingography in our set up and hysteroscopy whichever indicated.

MATERIAL & METHODS

The present study was done in the department of radiodiagnosis, Assam Medical College & Hospital, Dibrugarh, Assam during the period of July 2017 to June 2018. Study was done on 50 patients referred from Obstetrics & Gynaecology department with history of primary or secondary infertility. The patients with endometrial pathologies were recommended for hysteroscopic evaluation & those with tubal pathologies were subjected to hysterosalpingography.

INCLUSION CRITERIA:

Females with history of primary or secondary infertility.

EXCLUSION CRITERIA:

Patients with known hormonal causes or systemic causes of infertility. Patients having active vaginal bleeding, suspected malignancy of genital tract & presence of acute or subacute pelvic infections.

Sonographic imaging was performed with TOSHIBA APLIO-500 scanner with Transducer 5 to 7.5 MHz transvaginal transducer. On TVS thorough examination of endometrial wall & cavity, myometrium, both adnexa and ovaries were examined.

SALINE INFUSED SONOHYSTEROGRAPHY:

It involves the instillation of sterile saline into the endometrial cavity under ultrasound guidance. The saline distends the cavity, separating the walls of the endometrium and provides the anechoic interface for assessing the endometrial lesions. For assessing the patency of fallopian tubes the TVS probe is focussed on area between the cornua of the uterus and ovary on one side and then saline is pushed rapidly to look for gush of fluid “Water fall sign”.

All patients were subjected to X-ray hysterosalpingography & hysteroscopy for confirmation of tubal blockage and endometrial pathologies respectively. Thus both true & false positives with true & false negatives were accurately evaluated.

RESULTS & ANALYSIS:

Out of 50 subjects in the study group, 36 patients were having primary infertility & 14 patients had secondary infertility.

Most of the patients participated in the study group had tubal blockage (40 %) and 32% of the patient had endometrial pathology. 10 % of the patient had both endometrial and tubal pathology which also includes congenital anomalies. 18 % of the subjects did not have any endometrial or tubal pathology.

Out of the total 50 patients of the study group only 16 patients (32%) were detected to have endometrial pathology. Out of these 16 patients, 37.5% had endometrial polyps and 31.2% had submucosal myoma and intrauterine adhesions/synechia each.

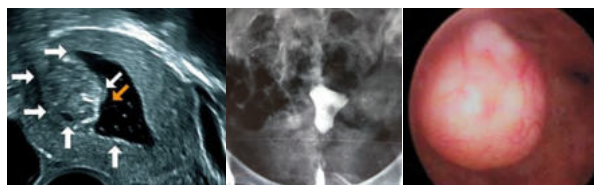
All the suspected cases of endometrial polyps were referred for hysteroscopic evaluation and management. Total 6 patients out of 50 subjects had suspected endometrial polyps and underwent hysteroscopic evaluation. Out of the 6 patients only 4 had endometrial polyp and hysteroscopic resection was done, rest 2 were found to be endometrial hyperplasia. Thus SIS test has sensitivity of 100% & specificity of 95.65%.

After comparing with hysteroscopy, SIS has sensitivity of 80.00% & specificity of 97.78% in the diagnosis of submucosal myoma. SIS has a 100% sensitivity and specificity for detecting uterine synechia/adhesions. Over all SIS has sensitivity of 92.8% & specificity of 91.7% for detecting overall endometrial pathology.

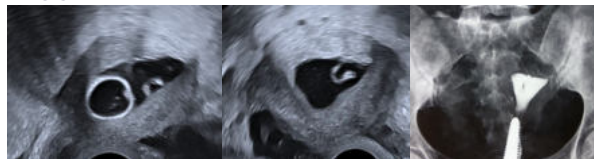
While routine trans vaginal sonography has a sensitivity of 28.6% & specificity of 97.2% for detecting endometrial pathology.

Compared to hysterosalpingography SIS has 95% sensitivity & 96.67% of specificity for detection of tubal blockage.

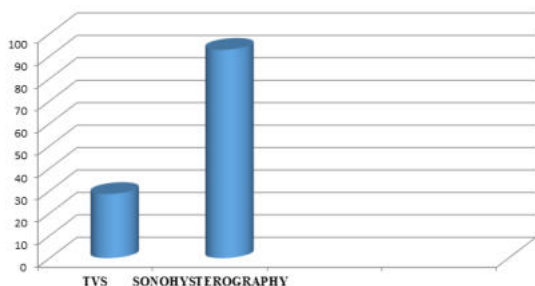
CASE 1: SUBMUCOSAL MYOMA WITH BILATERAL TUBAL BLOCKAGE



CASE 2: UTERINE SYNECHIAE WITH BILATERAL TUBAL BLOCK



Sensitivity comparison of TVS & SIS in detecting endometrial pathology



PATHOLOGICAL DISTRIBUTION OF INFERTILITY



DISCUSSION:
DIAGNOSTIC PERFORMANCE OF (SIS) IN THE EVALUATION OF TUBAL PATENCY. All the patients were re-evaluated with hysterosalpingography for assessing tubal blockage. Out of the 20 cases of unilateral/bilateral tubal blockage only 19 had the same finding. Rest of the 21 patients had bilateral patent fallopian tubes. Among those 19 subjects, 10 were having bilateral tubal blockage and 9 of them were having unilateral tubal blockage. The most common site of the tubal block was fimbrial part followed by cornual block.

Inference:
 Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of saline infused sonohysterography for assessing tubal patency were found to be 95.00%, 96.67%, 95.00%, 96.67% and 96% respectively in this study. **Similar study was done by: Dzotsenidze TN et al in 2006¹ on contrast sonohysterosalpingography in the study of tubal patency and in infertile patients,** where they found sensitivity, specificity, PPV and NPV of SHG for the assessment of tubal status were 98.8%, 92.5%, 91.4% and 92%.

DIAGNOSTIC PERFORMANCE OF (SIS) IN EVALUATION OF ENDOMETRIAL PATHOLOGY: All the 50 patients including positive and negative endometrial findings were referred for hysteroscopic evaluation. 16 subjects which were having endometrial pathology in SIS, only 13 were true positive, 3 were false positive and 1 was falsely negative. Out of the 3 false positive cases 2 were initially diagnosed as endometrial polyps in sonohysterography were actually confirmed as endometrial hyperplasia in hysteroscopy.

Inference:
 Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy of saline infused sonohysterography for endometrial pathology were found to be 92.85%, 91.67%, 81.25%, 97.05% and 92% respectively in this study.

Similar study was done by Seshadri et al in 2014² "Diagnostic accuracy of saline infusion sonography in the evaluation of uterine cavity abnormalities prior to assisted reproductive techniques: a systematic review and meta-analyses" they found the sensitivity and specificity of sonohysterography as 88% & 94% respectively. The positive and negative likelihood ratios were 20.93 and 0.15 respectively.

SIS could accurately diagnose different endometrial pathologies. The different endometrial pathologies found in the studies were submucosal myoma, uterine synechia, endometrial polyps. All these pathologies had distinguished characteristics from each other. Endometrial polyp identified as a pedunculated mass having vascularity in stalk whereas the submucosal myomas were noted as focal bulge in endometrium making acute angles with the endometrial cavity. The echogenic strands in the endometrial cavity were identified as uterine synechia.

DIAGNOSTIC PERFORMANCE OF TRANSVAGINAL SONOGRAPHY FOR DETECTING ENDOMETRIAL LESIONS:

Out of total 14 subjects who were diagnosed to have endometrial pathology, transvaginal sonography (TVS) could detect abnormality only in 4 patients. TVS cannot distinguish between the various lesions of endometrial pathology.

Inference:
 Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of TVS for endometrial pathology were found to be 28.57%, 97.22%, 80.00%, 77.78%, and 78%, respectively in this study.

This finding was similar to: Shokeir T et al in 2009³ "sonohysterography as a first line evaluation for uterine abnormalities in women with recurrent failed in vitro fertilisation-embryo transfer" in this study they applied TVS, SIS & Hysteroscopy in 62 patients and they found that out of 17 pathological conditions TVS could diagnose only 4 case thus giving a sensitivity of 23.5%.

Normal saline inflating the endometrial cavity provides anechoic interface for excellent visualization of endometrial wall and pathologies.

CONCLUSION:

SIS is an established, reliable and cost-effective diagnostic modality for intrauterine and tubal patency assessment. The diagnostic accuracy of the SIS is comparable with hysteroscopy and hysterosalpingography along with it provides advantage of being non-invasive, having minimal pain and trauma compared to hysteroscopy and hysterosalpingography. Though TVS is baseline investigation of infertility it is not an adequate test for assessment of intrauterine pathology, moreover TVS cannot assess tubal patency. Based on the diagnostic accuracy of SIS and ease of doing, it can be alternative to both hysterosalpingography and hysteroscopy and must be included for screening of all infertile female patients.

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