



Analyzing the Role of Saline Infusion Sonography in the Characterization of Endometrial Pathologies

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Abstract

Background: Endometrial abnormalities are significant causes of abnormal uterine bleeding (AUB). Transvaginal sonography (TVS) can depict the various causes for abnormal uterine bleeding with better clarity, when compared to a trans abdominal scan. The disadvantage is that TVS depicts all the endometrial causes of abnormal uterine bleeding as endometrial thickening either focal or diffuse or as endometrial irregularities. Saline infusion sonography (SIS) or sonohysterography is an innovative technique by which instillation of fluid into endometrial cavity distends the endometrial cavity, separating the two layers and better depicting the endometrial lesion.

Materials and Method: A prospective study was conducted in 53 patients with abnormal uterine bleeding and infertility, in the department of Radiodiagnosis, Government Medical college, Thrissur during the period of June 2009 to May 2010

Results: 50 patients with abnormal uterine bleeding were included in the study among them 11 were in postmenopausal group. In 3 patients sonohysterography was unsuccessful due to cervical stenosis and patulous cervix. The overall sensitivity, specificity, positive predictive value and negative predictive value of the procedure in this study were 92.8%, 81.8%, 86% 90% respectively.

Conclusion: Sonohysterosalpingography can distinguish focal from diffuse pathology reliably and has become a crucial imaging test in the triage of postmenopausal bleeding and in premenopausal patients with dysfunctional uterine bleeding or infertility.

Keywords: Abnormal Uterine bleeding, Sonohysterosalpingography, endometrial polyp, endometrial hyperplasia.

Introduction

Endometrial abnormalities are significant causes of abnormal uterine bleeding (AUB). Hysterosal-

pingography has been used to diagnose uterine abnormalities, but this method requires radiation and has less than optimal sensitivity. Transvaginal

sonography (TVS) can depict the various causes for abnormal uterine bleeding with better clarity, when compared to a trans abdominal scan. The disadvantage is that TVS depicts all the endometrial causes of abnormal uterine bleeding as endometrial thickening either focal or diffuse or as endometrial irregularities.

Saline infusion sonography (SIS) or sonohysterography is an innovative technique by which instillation of fluid into endometrial cavity distends the endometrial cavity, separating the two layers and better depicting the endometrial lesions. Sonohysterography yields additional information over TVS of the uterus. Because walls of the endometrium are separated by sonohysterography, they can be evaluated individually. This allows differentiation between focal and diffuse processes or subendometrial pathologic conditions. This procedure helps in better visualization of submucous or intramural fibroids.

SIS offers the advantage that ultrasound of uterus, ovaries and pelvis can be performed at the same time. Uterine masses and other abnormalities can be discovered.

Materials and Methods

A prospective study was conducted in 53 patients with abnormal uterine bleeding and infertility, in the department of Radiodiagnosis, Government Medical College, Thrissur during the period of June 2009 to May 2010. Patients with active bleeding, PID and pregnancy are excluded from the study.

Study Instrument and Procedure

An initial baseline Transabdominal and Transvaginal ultrasound done in all cases. Endometrial thickness greater than 8mm during proliferative phase, greater than 16mm in secretory phase and greater than 5mm in postmenopausal age group was considered abnormal. In those with abnormal endometrium and those on infertility work up, sonohysterography was performed.

Philips- Ensivor HD ultrasound equipment with 5-7.5 MHz TVUS probe.

8Fr Foley's catheter with stylet and bulb.

Timing of procedure – day 4-6 of menstrual cycle.

Technique

After obtaining the ethical clearance from Institutional Research Board and consent from the patients, study was commenced. Under aseptic precautions, cervix is exposed with speculum, cervical lip held with vulsellum forceps and 8Fr Foley's catheter was introduced for a length of 5-10cm. 1-2 ml of saline is introduced into Foley's bulb and catheter withdrawn a little so that bulb lies just above the internal os. The inflated balloon prevents backflow of fluid, thus causing good uterine distension. Speculum is removed and TVS probe introduced. Continuous scanning in the sagittal and coronal planes performed during instillation of sterile saline. 5-20 ml of saline was introduced to distend the endometrial cavity.

Data collection and analysis

Normal findings noted were symmetrical distension of endometrial cavity and homogeneous single layer thickness of endometrium less than 6mm in premenopausal and less than 2mm in post menopausal age group. Abnormal findings were recorded. Patients were followed up. SHG results were compared with histopathology reports obtained at dilatation and curettage and hysterectomy.

The collected data were entered in MS Excel and analysed using SPSS16. Sensitivity, specificity, positive predictive value and negative predictive value of SIS were found.

Results

53 cases of abnormal uterine bleeding and infertility were included. In 3 patients sonohysterography was unsuccessful due to cervical stenosis and patulous cervix. Of the 50 patients, 39 were in premenopausal and 11 in the postmenopausal age group.

Abnormal uterine bleeding was the major presenting symptom (58%) followed by infertility (42%). Different patterns of AUB in these 29

patients were postpartum bleeding (4%), postmenopausal bleeding (30%), metrorrhagia (20%) and menorrhagia(46%).

Out of the 50 patients who underwent SHG, 30 were suspected to have endometrial pathologies. On SHG, 13 had diffuse pathology,12 had focal pathology, 2 had focal and diffuse pathologies, 2 were normal and 1 had intramural pathology

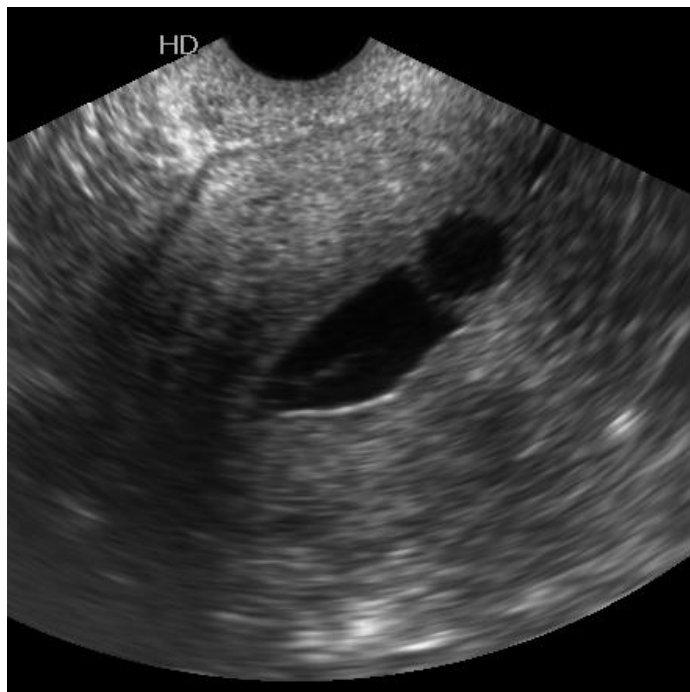


Figure 1 showing Normal endometrium in sonohysterosalpingography

14 focal lesions and 15 diffuse lesions were found in sonohysterography.

The focal lesions diagnosed in SHG were the following.

Endometrial polyps – 9	64%
Submucosal fibroids – 4	29%
Retained products of conception – 1	7%

Table1 showing focal lesions diagnosed by sonohysterosalpingography

Characteristic features detected at SHG in endometrial polyps cases were as follows.

Number of polyp : solitary – 8 and multiple – 1 .
Sessile – 4 and pedunculated – 5.

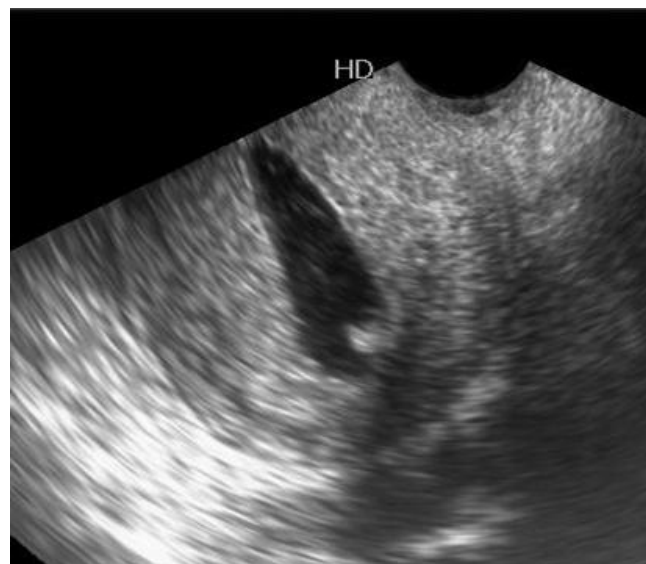


Figure 2 SHG showing solitary sessile hyperechoic polyp

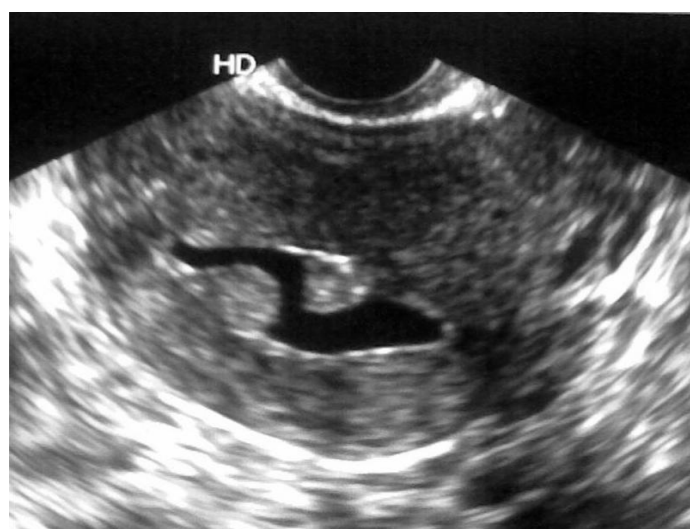


Figure 3 showing multiple hyperechoic sessile polyps.



Figure 4: SHG showing submucous fibroid

Presence of cystic change was seen in 2 of endometrial polyps.

Out of the 9 endometrial polyps reported, 7 were true endometrial polyps and 2 were focal endometrial hyperplasia.

The main difference between the two lies only in the gross appearance of the session in the pathological specimen

Endometrial polyps on SHG	HPE
Endometrial polyps	7
Focal endometrial hyperplasia	2

Table2 showing correlation of focal lesions detected in sonohysterosalpingography with histopathology

Characteristic features of 15 cases of diffuse endometrial hyperplasia detected at SHG cases were as follows.

Associated with endometrial polyp – 2.

Cystic change in endometrial hyperplasia – 2.

Diffuse endometrial hyperplasia on SHG	HPE
Diffuse endometrial hyperplasia	7(46.6%)
Secretory endometrium	4 (26.5%)
Diffuse endometrial hyperplasia with polyp	2 (13.3%)
Cystic endometrial hyperplasia	2(13.3%)

Table 3 showing correlation of diffuse lesions detected in sonohysterosalpingography with histopathology

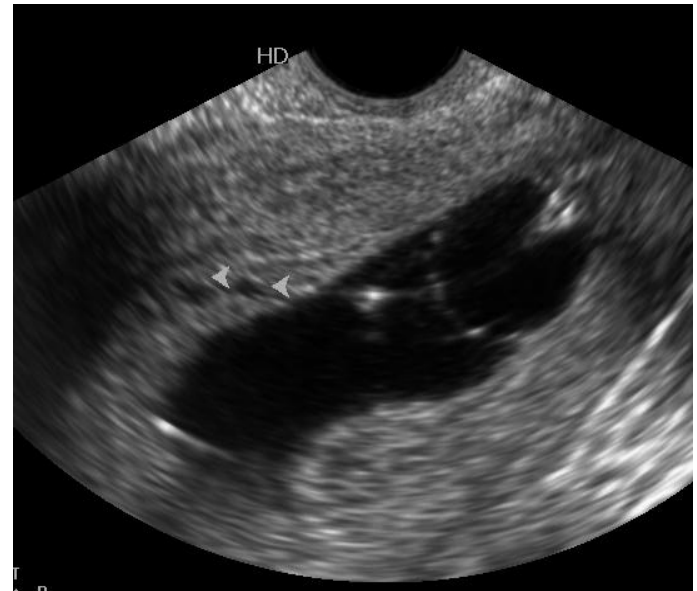


Figure 5 SHG showing diffuse endometrial hyperplasia

With these findings, there were 26 true positives, 18 true negatives, 4 false positives and 2 false negatives.

Sensitivity	92.8%
Specificity	81.8%
Positive predictive value	86.6%
Negative predictive value	90%
Accuracy of the study	88%

Table 4 showing the sensitivity, specificity, positive and negative predictive value of sonohysterosalpingogram in detecting diffuse lesion

Sensitivity of SHG for detecting diffuse pathology was 81.8% and focal pathology was 100%.

Discussion

Sonohysterography is a simple ultra sound procedure that can be used to evaluate the endometrium. In endometrial lesions, more than providing the exact pathological diagnosis. SHG plays an important role in differentiating diffuse and focal pathologies.

The overall sensitivity, specificity, positive predictive value and negative predictive value of the procedure in this study were 92.8%, 81.8%,86% 90% respectively. This correlates well

with results in the study conducted by Robert L. Bree et al⁽¹⁾ in which findings yielded a sensitivity of 98%, specificity of 88%, positive predictive value of 94%, and negative predictive value of 97%. In a study by Yildizhan et al⁽²⁾, sensitivity and specificity were 91.6% and 98.7% respectively. In a study by Mathew M, Gowri et al⁽³⁾, the sensitivity, specificity, positive predictive value, negative predictive value were 91.4%, 92.6%, 89.3% and 94.1% respectively. In a study by Pasrija et al⁽⁴⁾ sensitivity and specificity were 94.1% and 88.5% respectively.

Diagnostic accuracy of this study was 88%. This is comparable to the study by Nass Duce M et al⁽⁵⁾ which states a diagnostic accuracy of 90.6%.

SHG was performed in our department as an outpatient procedure. No significant complications were encountered except for mild bleeding and mild abdominal pain.

Focal Endometrial Lesions

The main focal endometrial lesions deduced in the study were endometrial polyps, submucous fibroids and retained products of conception.

Most of the patients were premenopausal within the age group of 30 -40 years and presented mainly with menorrhagia and metrorrhagia. Endometrial polyp was associated with infertility in one patient. All the polyps were uniformly hyperechoic, either sessile or pedunculated and with distinct endometrial myometrial interface. This correlates with the findings in the studies conducted by and Patricia. Davis et al⁽⁶⁾

Submucous fibroids were seen mainly in premenopausal age group of 30 – 45 years and the main presenting complaint was menorrhagia. On SHG submucous fibroids were broad based, hypoechoic, well defined solid masses with shadowing and an overlying layer of echogenic endometrium that disorients the endometrial myometrial interface. This is comparable with the results in the study conducted by Patricia C Davis et al⁽⁶⁾

Residual trophoblastic tissue was detected in a patient with post partum bleeding which did not respond to repeated D &Cs. SHG showed a

heterogeneous mass attached to endometrial lining which correlated with study conducted by Zalel Y. et al⁽⁷⁾ and Wolman et al⁽⁸⁾

The major drawback of the study was that no case of endometrial carcinoma could be detected. This was probably due to the fact that only a few patients in the postmenopausal age group were included in the study. Technical difficulty due to cervical stenosis was also experienced while performing the study in postmenopausal age group. Due to theoretical concern of transtubal dissemination of endometrial carcinoma into the peritoneal cavity^(9,10), Gynecologists were also not keen in undertaking SHG in clinically and transvaginal sonologically suspected cases of endometrial carcinoma.

Diffuse Endometrial Lesions

The most common diffuse endometrial lesion detected by SHG was diffuse endometrial hyperplasia. AT SHG diffuse endometrial hyperplasia appeared as diffuse thickening of echogenic endometrial stripe without focal abnormality. Cysts were present in 2 cases. These findings correlated well with those in the study conducted by Johanna R. Jorizzo et al⁽¹¹⁾. False positivity due to secretory endometrium was detected in 4 cases. This occurred probably due to incorrect timing of the procedure.

Conclusion

Sonohysterography is a simple, well tolerated outpatient procedure that improves the evaluation of potentially abnormal endometrium.

It can distinguish focal from diffuse pathology reliably and has become a crucial imaging test in the triage of postmenopausal bleeding and in premenopausal patients with dysfunctional uterine bleeding or infertility.

Polyps and submucous fibroids are the most common focal findings during SHG.

In post menopausal patients, detection and accurate localization of findings, rather than lesion characterization, are the primary goals of the procedure.

This technique has a few contraindications (eg. Acute pelvic inflammatory disease) and leads to virtually no complications.

It may be performed rapidly without significant patient discomfort and provides the referring physician with valuable information that will help to determine the next step in case management in a cost effective manner

However most, if not, all, focal lesions in patient population, with abnormal focal lesions require tissue diagnosis, even when the imaging features, suggest benign lesions.

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