

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20161682>

Research Article

Uterine cavity evaluation in infertile patients with transvaginal sonography, saline infusion sonography and hysteroscopy

Neena Gupta^{1*}, Seema Dwivedi¹, G. N. Dwivedi², Bandana Sharma¹, Pragati Gupta¹

¹Department of Obstetrics and Gynecology, GSVM Medical College, Kanpur, UP, India

²Department of Paediatrics, GSVM Medical College, Kanpur, UP, India

Received: 29 March 2016

Revised: 07 May 2016

Accepted: 10 May 2016

***Correspondence:**

Dr. Neena Gupta,

E-mail: Neena.gupta2211@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: To compare diagnostic accuracy of Transvaginal sonography (TVS), Saline infusion sonography (SIS) and hysteroscopy in infertile women.

Methods: In a prospective study, 250 women with complaint of infertility underwent TVS and SIS. Diagnostic and operative hysteroscopy under general anaesthesia was then performed.

Results: Hysteroscopy with directed biopsy was considered as the gold standard. Endometrial polyp (n=25, 10%), submucosal fibroid (n=12, 4.8%), suspected intrauterine adhesions (n=4, 1.6%) and congenital uterine anomaly (n=2, 0.8%) were detected with TVS. In the evaluation with SIS results Endometrial polyp (n=34, 13.6%), submucosal fibroid (n=20, 18.1%), suspected intrauterine adhesions (n=5, 2%) and congenital uterine anomaly (3, 1.2%). Hysteroscopy results detected Endometrial polyp (n=32, 12.8%), submucosal fibroid (n=19, 7.6%), suspected intrauterine adhesions (n=8, 3.2%) and congenital uterine anomaly (n=5, 2%).

Conclusions: TVS is the primary investigative method for evaluating every infertile couple by means of uterine cavity and ovaries. Hysteroscopy is superior to SIS in diagnosis of intracavitary abnormalities. However SIS has the advantage of being noninvasive, cheap, affordable, short duration and accurate method for uterine cavity evaluation.

Keywords: Infertility, TVS, SIS, Hysteroscopy, Intrauterine anomalies

INTRODUCTION

Uterine cavity abnormalities can be a contributing cause of infertility and recurrent pregnancy implantation failure. It has been established that the implantation of fertilised eggs during spontaneous cycle or of blastocysts during assisted reproductive treatment is affected by morphology and thickness of endometrium and by the shape of uterine cavity.¹ Submucous fibroid, endometrial polyps, congenital uterine abnormalities and intrauterine adhesions are all potential causes of infertility.² Distortion of uterine cavity by a fibroid or a septum can lead to implantation failure and recurrent early miscarriage.³ Uterine cavity abnormalities have been considered as the underlying etiology among 10-15% of couples seeking infertility treatment. Examination of the uterine cavity is

an integral part of thorough evaluation of an infertile couple. There are several methods for assessing the uterine cavity Trans-vaginal sonography, hysteroscopy, saline infusion sonography, hysterosalpingography.

Hysteroscopy permits the inspection of cervical canal and uterine cavity and evaluation of the tubal ostium and proximal intramural segment of the fallopian tubes.⁴ It is considered the gold standard for the assessment of the intra uterine abnormalities.⁵ The procedure is accompanied by the risks of such complications as uterine perforation, infection, bleeding, burns and air embolism.^{6,7} TVS is safe, non-invasive and relatively inexpensive procedure initially described for ovarian follicles monitoring, now it can be performed routinely in the evaluation of uterine cavity in the infertile female.

The finding of a thickened central endometrial complex seen on TVS is often nonspecific and may be caused by endometrial polyp, submucosal fibroid, endometrial hyperplasia and carcinoma. SIS is the technique in which the endometrial cavity is distended with saline during ultrasonographic examination whether transabdominal or transvaginal. It permits single layer evaluation of endometrial lining and enable sonologist to reliably distinguish a focal from diffuse endometrial pathologic condition.

The present study was designed to compare the diagnostic accuracy of TVS, SIS with hysteroscopy for the evaluation of uterine cavity in infertile period.

METHODS

The study population included 250 infertile women attending UISEMH, Kanpur, India in between 2013 to 2015. All patients were scheduled to undergo TVS, SIS and hysteroscopy for assessment of uterine factor. All patients gave informed consent to participate in the clinical study. A thorough gynaecological and medical history was taken, physical examination was performed and routine investigation was sent. TVS was performed with using 4-9 mm transducer. The uterus was examined in both longitudinal and transverse section to visualize the whole endometrium and the endometrial cavity. A contour defect was considered as polyp when it was completely surrounded by endometrium and submucosal fibroid when myometrium on the other side and the endometrial cavity was distorted.

Intrauterine adhesion appeared as an irregular central line in the endometrium. During midcycle uterine synechiae were visualised much better as a hyperechoic, irregular, sometime cord like feature that could be delineated better in the echo free space between the basalis layer, interrupting the integrity of the uterine cavity. The appearances of the septate uterus on TVS included a convex, flat and minimally indented fundal contour with an echogenic mass dividing the cavity, the proximal part of which passes an echographic texture indicative of myometrium merging in to hypoechoic fibrous tissue distally. For SIS informed consent is usually obtained. With aseptic precaution a speculum is inserted to visualise the cervix. A no. 8 of foley's catheter is inserted in to the cervix with sponge forceps and balloon of catheter is inflated with 2-3 cc of normal saline to prevent air within balloon from causing a shadow that would make visualisation of uterine pathology impossible. The uterine cavity filled with normal saline under continues sonographic control. It differentiates between intramural myomas and submucosal fibroid better than other ultrasound modalities and enables to differentiate an endometrial polyp from sub mucous fibroid. After brief explanation of the procedure hysteroscopy was performed in the dorsolithotomic position. Full aseptic and antiseptic precautions were observed, the cervix and vagina were

swabbed. A bimanual examination was performed to determine position and mobility of the uterus.

The cervix was grasped with vassellum and gently dilated with hegar dilater, if necessary and a 5 mm hysteroscope was inserted. Normal saline solution was used to distend the uterine cavity for optimal visualization. The hysteroscopic findings were categorized as normal or abnormal (polyps, fibroids, intrauterine adhesions or congenital uterine malformations

RESULTS

Table 1: Demographic profile.

		No. of patients	%
Age	<25 yrs	65	31.7%
	25-29 yrs	70	28%
	30-34 yrs	95	38%
	>35 yrs	20	8%
Socioeconomic status	Low	125	50%
	Middle	75	30%
	High	50	20%

Table 2: Types of infertility.

	No. of patients	%
Primary	100	40%
Secondary	150	60%
Total	250	100%

Table 3: Comparison of TVS findings with HPE diagnosis in infertile patients.

Diagnosis	TVS	HPE
Normal endometrium	207 (82.8%)	190 (76%)
Endometrial polyp	25 (10%)	32 (12%)
Submucosal fibroid	12 (4.8%)	17 (6.8%)
Intrauterine adhesion	4 (1.6%)	-
Congenital uterine anomaly	2 (0.8%)	-
Total	250(100%)	

Hysteroscopy with directed biopsy was considered as the gold standard. Endometrial polyp (n=25, 10%), submucosal fibroid (n=12, 4.8%), suspected intrauterine adhesions (n=4, 1.6%) and congenital uterine anomaly (n=2, 0.8%) were detected with TVS. In the evaluation with SIS results Endometrial polyp (n=34, 13.6%), submucosal fibroid (n=20, 18.1%), suspected intrauterine

adhesions (n=5, 2%) and congenital uterine anomaly (3, 1.2%). Hysteroscopy results detected Endometrial polyp (n=32, 12.8%), submucosal fibroid (n=19, 7.6%), suspected intrauterine adhesions (n=8, 3.2%) and congenital uterine anomaly (n=5, 2%).

Table 4: Comparison of SIS findings with HPE diagnosis in infertile patients.

Diagnosis	SIS	HPE
Normal endometrium	188 (75.2%)	190 (76%)
Endometrial polyp	34 (13.6%)	30 (12%)
Submucosal fibroid	20 (18%)	17 (6.8%)
Intrauterine adhesion	5 (2%)	-
Congenital uterine anomaly	3 (1.2%)	-
Total	250(100%)	

Table 5: Comparison of hysteroscopy findings with HPE diagnosis in infertile patients.

Diagnosis	Hysteroscopy	HPE
Normal endometrium	183 (73.2%)	190 (76%)
Endometrial polyp	32 (12.8%)	30 (12%)
Submucosal fibroid	19 (7.6%)	17(6.8%)
Intrauterine adhesion	8 (3.2%)	-
Congenital uterine anomaly	5 (2%)	-
Total	250(100%)	

Table 6: Comparative evaluation of sensitivity, specificity of TVS, SIS and hysteroscopy in diagnosing endometrial polyp, submucosal fibroid, intrauterine adhesions and congenital uterine anomaly.

Diagnosis	Procedure	Sensitivity	Specificity
EP	TVS	66.6%	89.5%
	SIS	100%	91.6%
	HYS	100%	95.8%
SF	TVS	58.8%	96.7%
	SIS	82.8%	90.3%
	HYS	76.4%	90.16%
IUA	TVS	50%	100%
	SIS	62.5%	100%
	HYS	100%	100%
CUA	TVS	25%	98.64%
	SIS	50%	98.64%
	HYS	100%	97.33%

DISCUSSION

In our clinical study uterine cavity abnormalities were diagnosed by hysteroscopy in 64 infertile women (25.6%). This observation was in concordance with the results of Bartkowiak et al, who identified intrauterine abnormality in about 25% of hysteroscopic examinations of infertile patients. Whereas in the study of Hucke et al intrauterine pathologies were diagnosed in 20% of patients infertility was more common than primary infertility.⁸ Most common uterine abnormality was endometrial polyp (12%). Rogerson et al recorded that endometrial polyps were common incidental findings in sonographic Majority of patients belonged to 30 – 35 years (38%) of age group with lower socioeconomic status. De Geyter et al found that endometrial polyps were present in 3.8-5.8% of infertile women.⁹

Endometrial polyp was most sensitively (100%) diagnosed by hysteroscopy and SIS and the specificity of this was highest for hysteroscopy.

By our study TVS, SIS and Hysteroscopy had sensitivities of 66.6%, 100% and 100% and specificities of 89.5%, 91.6% and 95.8% respectively for detection of endometrial polyp.

For endometrial polyp, Cepni et al, found that TVS, SIS and Hysteroscopy had sensitivities of 72%, 91% and 94% and specificities of 50%, 64% and 78% respectively.¹⁰ Kamal et al, stated that SIS is more accurate than TVS at demonstrating small polyps, diminishing false positive and false negative rate of TVS by at least 66% in one comparison.¹¹

Submucosal fibroids were second most common uterine anomaly (6.8%) in our study. In our study for submucosal fibroid TVS, SIS and Hysteroscopy had sensitivities of 58.8%, 82.8% and 76.4% and specificities of 96.7%, 90.3% and 90.16% respectively.

For diagnosis of submucosal fibroid Cepni et al found that TVS, SIS and Hysteroscopy had sensitivities of 58%, 81% and 90% and specificities of 94%, 98% and 95% respectively

Intrauterine adhesions were detected in 3.2% of women involved in our study. This was in agreement with the study done by Hucke et al, who found that intrauterine adhesions were detected in 4% of infertile women. In our study for intrauterine adhesions TVS, SIS and Hysteroscopy had sensitivities of 50%, 62.5% and 100% and specificities of 100%. For diagnosis of intrauterine adhesions Krampfl et al found that TVS, SIS and Hysteroscopy had sensitivities of 23%, 94% and 100% and specificities of 93%, 84% and 87% respectively.

Our study showed that congenital uterine malformations were found in 2% of infertile women whereas Hucke et al, found that congenital malformations were found in

14% of infertile women. This finding in his study may have been influenced by selection bias as some of the patients had been referred to his center.

In our study for congenital uterine anomaly TVS, SIS and Hysteroscopy had sensitivities of 25%, 50% and 100% and specificities of 98.6%, 98.6% and 97.3% respectively.¹² Soares et al found that TVS, SIS and Hysteroscopy had sensitivities of 44%, 44% and 77% and specificities of 96%, 100% and 100% respectively in the diagnosing uterine malformations.

In our study we found 5 cases of congenital uterine malformations out of which 3 were cases of septate uterus and 2 were cases of bicornuate uterus.

In our study Hysteroscopy diagnosed all 5 cases of congenital uterine malformation as septate uterus.

For confirmation of diagnosis we used 3D USG.

CONCLUSION

TVS is simple, minimally invasive, low cost technique and it should be the first diagnostic method for evaluating every infertile couple by means of uterine cavity and ovaries. Focal lesions are underdiagnosed by TVS because of limitations of double layer thickness evaluation.

SIS is a second line diagnostic procedure if TVS findings are inconclusive.

Hysteroscopy approved to be more reliable in diagnosis than TVS and SIS and offers the possibility of simultaneous diagnosis treatment of intrauterine pathogenesis in infertile women. However SIS has the advantages of being minimally invasive, cheap, affordable, short duration and accurate method of uterine cavity evaluation.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Gonen Y, Casper RF, Jacobson W, Blankier J. Endometrial thickness and growth during ovarian stimulation: a possible predictor of implantation in vitro fertilization. *Fertil Steril.* 1989;52:446-50.
2. Lashen H. Female infertility. In Luesley DM, Baker PN, editors. *Obstetrics and Gynaecology. An evidence-based text for MRCOG.* 1st edn. London: Arnold. 2004;568.
3. Bartkowiak R, Kaminski P, Wielgos M, Bobrowska K. The evaluation of uterine cavity with saline infusion sonohysterography and hysteroscopy in infertile patients. *Neuroendocrinol Lett.* 2006;27:523-8.
4. Mencaglia L, Hamou JE. *Manual of hysteroscopy - Diagnosis and surgery.* Endo-Press, Tuttingen. 2001;33.
5. Rogerson L, Duffy S. The role of Hysteroscopy before IVF-ET. *MEFS J.* 2001;6:198-205.
6. De Jong P, Doel F, Falconer A. Outpatient diagnostic hysteroscopy. *BJOG.* 1990;97:299-303.
7. Syrop CH, Sahakian V. Transvaginal sonography detection of endometrial polyps with fluid contrast augmentation. *Obstet Gynecol.* 1992;79:1041-3.
8. Hucke J, de Bruyne F, Balan P. Hysteroscopy in infertility-Diagnosis and treatment including fallopscopy. Kchli OR(ed): *Hysteroscopy.* State of the Art. *Contrib Gynecol Obstet.* 2000;20:13-20.
9. De Geyter Ch, Schmitter M, De Geyter M, Nieschlag E, Holzgreve W, Hermann PG. Prospective evaluation of the ultrasound appearance of the endometrium in a cohort of 1186 infertile women. *Fertil Steril.* 2000;73:106-13.
10. Cepni I, Ocal P, Erkan S, Saricali FS, Akhas H, Demikiran F, et al. Comparison of transvaginal sonography, saline infusion sonography and hysteroscopy in the evaluation of uterine cavity pathologies. *Aust NZ J Obstet Gynaecol.* 2005;45:30-5.
11. Kamel HS, Darwish AM, Mohamed SA: Comparison of transvaginal ultrasonography and vaginal sonohysterography in the detection of endometrial polyps. *Acta Obstet Gynecol Scand.* 2000;79:60-4.
12. Soares SR, Barbosa dos Reis MM, Camargos AF. Diagnostic accuracy of sonohysterography, transvaginal sonography, and hysterosalpingography in patients with uterine cavity diseases. *Fertil Steril.* 2000;73:406-11.

Cite this article as: Gupta N, Dwivedi S, Dwivedi GN, Sharma B, Gupta P. Uterine cavity evaluation in infertile patients with transvaginal sonography, saline infusion sonography and hysteroscopy. *Int J Reprod Contracept Obstet Gynecol* 2016;5:1879-82.