

Comparative Evaluation of Saline Infusion Sonohysterography and Hysteroscopy for Diagnosis of Uterine Cavity Abnormalities and Tubal Patency in Infertility: A One Year Cross-sectional Study

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Abstract

Objective: To compare the diagnostic efficacy of saline infusion sonohysterography (SIS) with hysteroscopy in evaluation of uterine cavity and tubal patency.

Methods: This prospective one year cross-sectional study was conducted at the assisted reproduction center (ARC), KLES Dr Prabhakar Kore Hospital and Medical Research Centre, Belgaum. A total of 60 patients underwent SIS for evaluation of uterine cavity and tubal patency. Subsequently all patients underwent hysteroscopy with chromopertubation (CPT). Results of SIS and hysteroscopy with chromopertubation were compared.

Results: For evaluation of uterine cavity, when compared with hysteroscopy, SIS had a sensitivity of 97.8%, specificity of 88.8%, positive predictive value (PPV) of 97.8% and negative predictive value (NPV) of 88.8%. For evaluation of tubal patency when SIS was compared to hysteroscopy with CPT, SIS had a sensitivity of 83.3%, specificity of 82.9%, PPV of 42.9% and NPV of 97.5%.

Conclusion: Saline infusion sonohysterography is a noninvasive, simple, easy and cost-effective procedure. SIS is more sensitive and specific for evaluation of uterine cavity as compared to evaluation of tubal patency.

Keywords: Saline infusion sonohysterography, laparoscopy, hysteroscopy, infertility, tubal patency, assisted reproduction center, chromopertubation.

INTRODUCTION

Tuboperitoneal factors are responsible for about 30 to 40% of female infertility. The incidence of tubal disease in infertility varies from country to country. In India it has been estimated to be about 40%.¹ The prevalence of pelvic inflammatory disease and genital tract tuberculosis are common in our country and hence the incidence of tubal factor in infertile women is high.² There are various methods available for evaluation of uterine cavity and tubal patency. The widely employed methods are hysterosalpingography (HSG) and hysteroscopy with CPT. Saline infusion sonohysterography (SIS) is being widely used for evaluation of uterine cavity as well as tubal patency.²

Every method has its own merits and demerits. HSG is an invasive technique associated with pelvic infection, pain and risk of radiation exposure.³ Small polyps cannot be picked up by HSG. Laparoscopy is also an invasive and expensive

procedure. It also carries the risk of anesthetic complications.⁴ In many cases of infertility hysteroscopy will be normal. Hence is a need for a screening test like SIS. Saline infusion sonohysterography is a simple, safe and minimal invasive procedure unlike hysteroscopy.⁵ SIS is also free from the risk of radiation exposure unlike HSG. The present study was done to compare the diagnostic accuracy of SIS with hysteroscopy and CPT for evaluation of the uterine cavity and tubal patency.

MATERIAL AND METHODS

This was a prospective one year cross-sectional study conducted at ARC, KLES Dr Prabhakar Kore Hospital and Medical Research Center, Belgaum. A total of 60 patients with primary and secondary infertility were included in the study. Women with acute pelvic infection were excluded from the study.

All infertile women who fulfilled the inclusion criteria were evaluated by a detailed history and clinical examination. They underwent SIS on the 7th or 8th day of menstrual cycle. Subsequently all women were subjected to hysteroscopy with chromopertubation. The data was subsequently analyzed to compare the results of SIS with hysteroscopy and CPT in the evaluation of uterine cavity and tubal patency.

PROCEDURE FOR SALINE INFUSION SONOHYSTEROGRAPHY

An informed consent was taken. Premedication (Injection Atropine 0.6 mg and Injection Pentazocine 30 mg IM) was given 15 minutes prior to the procedure. A transvaginal ultrasound was performed prior to SIS to look for any endometrial polyp and presence of fluid in the pouch of douglas (POD). The vulva and vagina were cleaned with antiseptic solution. Sims speculum was introduced and the anterior lip of cervix was held with vulsellum. A sterile Gynetics-Belgium intrauterine insemination (IUI) catheter was inserted into the uterine cavity. The catheter was prefilled with saline prior to insertion to minimise an artefact. The guard of the IUI catheter was repositioned so as to snugly fit into the cervical canal to prevent the back flow of saline. The speculum was removed and continuous intravenous drip of normal saline was connected to the IUI catheter.

Once adequate distension of uterine cavity was achieved a sagittal sweep from cornua to cornua followed by an axial sweep from fundus to external cervical os was performed with a transvaginal probe. The cavity was evaluated for presence of any abnormality. Subsequently each tube was visualized separately for the presence of fimbrial turbulence (water fall sign) which was taken as a sign of tubal patency. Presence of fluid in POD after SIS which was previously absent on ultrasonography was also taken as a sign of tubal patency. At the end of the procedure retrograde leakage, pain and time taken for the procedure were also noted.

RESULTS

Majority of the women in the present study were in the age group of 25 to 34 years (Table 1). 75% of our women had primary infertility (Table 2).

The mean duration of infertility was 7.7 years (Table 3).

For the evaluation of the uterine cavity SIS has a sensitivity of 97.8%, specificity of 88.8%, PPV of 97.8% and NPV of 88.8% in our study (Table 4).

Out of the 56 women who underwent SIS, abnormalities of uterine cavity were detected in eight women and uterine cavity was normal in 48 women. Subsequently hysteroscopy confirmed the presence of uterine cavity abnormalities in seven women. However, one woman who was detected to have a uterine cavity abnormality by SIS was found to be normal. The various uterine cavity abnormalities detected by SIS are shown in Table 5, which were confirmed by hysteroscopy.

For evaluation of tubal patency with waterfall sign SIS has a sensitivity of 83.3%, specificity of 82.9%, PPV of 42.9% and NPV of 97.5% (Table 6). It was also observed that only presence of fluid in the POD for diagnosing tubal patency had a sensitivity of 75%, specificity of 92.4%, PPV of 50% and NPV of 98% (Table 7).

73.3% of patients did not experience pain during the procedure, 18.3% had mild pain and 1.7% had moderate pain.

There was no retrograde leak in 60.7% of women. Minimal leakage was noted in 37.5% of women undergoing SIS. In 1.8% cavity could not be distended as the cervical os was patulous.

The average time taken for SIS was 10.9 minutes.

Table 1: Age incidence

Age (years)	No. of cases	Percentage (%)
20–24	10	16.6
25–29	19	31.6
30–34	19	31.6
35–39	09	15.0
>40	3	5.0

Table 2: Duration of infertility

Duration of infertility (Years)	No. of cases	Percentage (%)
> 5	17	28.3
5–10	23	38.3
10–15	15	25.0
> 15	05	8.3

Table 3: Incidence of primary and secondary infertility

Type	No. of cases	Percentage (%)
Primary	45	75
Secondary	15	25
Total	60	100

Table 4: Evaluation of uterine cavity

	Saline infusion sonohysterography (n = 56)	Hysteroscopy (n = 56)	
		Normal	Abnormalities
Normal	48	47	01
Abnormalities	08	01	07

Table 5: Uterine cavity abnormalities

	Saline infusion sonohysterography	Hysteroscopy
Polyp	04	03
Submucous fibroid	02	02
Septate uterus	01	01
Uterine synechiae	01	02

Table 6: Tubal patency on SIS and laparoscopy

	Saline infusion sonohysterography (n = 56)	Laparoscopy with chromopertubation (n = 56)		
		Bilateral patency	Bilateral block	Unilateral block
Bilateral patency	40	39	-	01
Bilateral block	06	03	03	-
Unilateral block	07	05	-	02
Inconclusive	03	02	-	01

Table 7: Correlation of only fluid in POD and tubal patency

Saline infusion sonohysterography	Laparoscopy with chromopertubation (n = 56)		
	Bilateral patent	Unilateral patent	Bilateral block
Fluid in POD (n = 50)	46	04	-
No fluid in POD (n = 6)	03	-	03

DISCUSSION

In our study saline infusion sonohysterography had a high diagnostic accuracy (sensitivity of 97.8%, specificity of 88.8%, PPV of 97.8% and NPV of 88.8%) for detection of uterine cavity abnormalities. Similar results were seen in the study done by Theresa W et al⁶ where SIS when compared with hysteroscopy had a sensitivity of 96% and a specificity of 88%. In the study done by Alatas C et al⁷ when compared with hysteroscopy, SIS had a sensitivity of 98% and specificity of 93%. Similar results were observed in studies done by Diaferia D et al,⁸ Alborzi S et al⁹ and Milingos S et al.¹⁰ In our study SIS diagnosed one case as endometrial polyp which was found to be normal on hysteroscopy. We attribute this false positivity to the misinterpretation of artefacts due to the inadvertent injection of air bubbles as well as cervical mucus into the uterine cavity. One case of uterine synechiae was missed on SIS, probably due to inadequate distension of the uterine cavity due to retrograde leakage.

The diagnostic accuracy of SIS for tubal patency (sensitivity of 83.3%, specificity of 82.9%, PPV of 42.9% and NPV of 97.5%) was less when compared with the diagnostic accuracy of SIS for detection of uterine cavity abnormalities. The accuracy of diagnosis of unilateral tubal patency (97.5%) by SIS was higher than for diagnosis of bilateral block (50%). This could be attributed to bilateral tubal spasm. In our study we experienced difficulty in locating side specific tubal patency. This was probably due to the slow spillage of fluid not resulting in fimbrial turbulence on the particular side reported as tubal block by SIS. In a similar study conducted by Seal SL et al when compared with hysteroscopy and CPT SIS had a sensitivity of 97.3% and specificity of 92% for tubal patency.² Correlating fluid in

POD on SIS and tubal patency, SIS had a sensitivity of 75%, specificity of 94.2%, PPV of 50% and NPV of 98%. In a study done by Darwish AM et al¹¹ the agreement for diagnosing tubal patency by the presence of fluid in the POD with laparoscopy was 88.1%.

In the present study 73.3% of women did not experience pain at all, 18.3% had mild pain and only 1.7% of women had moderate pain. The reduced incidence of pain was mainly due to the use of fine IUI catheter. The average time taken in our study for SIS was 10.9 minutes which was comparable to the time taken in the study done by Kore S et al.¹

In conclusion saline infusion sonohysterography offers a simple, inexpensive and noninvasive method of diagnosing uterine cavity abnormalities and tubal patency, while maintaining a high sensitivity and specificity similar to that of hysteroscopy. SIS is more sensitive and specific for evaluation of uterine cavity as compared to evaluation of tubal patency.

REFERENCES

- Kore S, Hegde A, Nair S, Ambiyee VR, Vaidya PR. Sonography for assessment of tubal patency. Our experience. J Obstet and Gynecol India 2000;50(2):63-66.
- Seal SL, Ghosh D, Saha D. Comparative evaluation of sonosalpingography, hysterosalpingography and laparoscopy for determination of tubal patency. J Obstet and Gynecol India March/April 2007;57(2):158-61.
- Laurence AM, Michael RS. Imaging of reproductive tract in infertile women: Hysterosalpingography, USG and MRI. Infertility evaluation and treatment. WB Saunders company USA, chapter 23 1995;300-03.
- Parihar M. Transcervical tubal evaluation. Infertility principle and practice: 44-49.
- Steven RG. Saline infusion sonohysterography. Clinical Obstetrics and Gynecology 2000;39(1):248-58.
- Theresa W, Linda DB, Allison RM. Comparison of saline infusion sonography with office hysteroscopy for the evaluation of endometrium. Am J Obstet and Gynecol 2006;174(4):1327-34.
- Cengiz A, Esra A, Cem A, Kayhan, Senai A, Mutler H. Evaluation of intrauterine abnormalities in infertile patients by sonohysterography. Human reproduction 1997;12(3):487-90.
- Diaferia D, Ragni G, Vigetti W, Colombo MA, Crosiognani PG. Sonohysterography for uterine cavity evaluation in infertility work up. Fertility Sterility 2000;74(3):530.
- Alborzi S, Dehbashi S, Khodace R. Sonohysterosalpingographic screening infertile patients. Int J of Gynecol and Obstet 2003;82:57-62.
- Milingos S, Kalipolitis G, Stefanidis K, Macris N, Loutradis D, et al. Saline contrast hysteroscopy in infertile patients and in women with abnormal uterine bleeding. Eur J Gynaecol Oncol 26(5):564-67.
- Darwish M, Youssef AA. Screening sonohysterography in infertility. Gynecol Obstet Invest 1999;48(1):43-47.