

Comparative study of Hysterosalpingography and Sonohysterosalpingography in the evaluation of fallopian tube patency in routine infertility assessment

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Abstract

Aim: This study aims at comparing the efficacy of Hysterosalpingography (HSG) and Sonohysterosalpingography (SonoHSG) in the evaluation of fallopian tube patency, based on laparoscopic confirmation. **Material and Methods:** 100 infertility patients were divided into two groups of 50 patients, by random allocation to each group. First group was subjected to HSG and second group patients were subjected to Sono HSG, as a routine infertility workup. All patients thereafter underwent laparoscopic chromopertubation and results were analyzed and compared. **Results:** In HSG group - sensitivity, specificity, positive predictive value (ppv) and negative predictive value (npv) were 82.5%, 100%, 100%, 58.8%, respectively. In Sono-HSG group- sensitivity, specificity, ppv and npv were 85.7%, 100%, 100%, 57.1%, respectively. **Conclusion:** Sono-HSG can be used as routine investigation in initial infertility work up, over HSG, due to its availability, accessibility, less side effects and low cost.

Keywords: HSG (hysterosalpingography), SonoHSG (Sonohysterosalpingography)

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INTRODUCTION

Infertility is defined as the inability of a couple to conceive after 1 year of regular unprotected intercourse. Infertility has been recognized as a public health issue worldwide by the World Health Organization (WHO). Infertility affects approximately 10-15% of couples in reproductive age group. Male factor infertility prevalence is 20-40%. The causes of female factors of infertility includes ovulatory factors, tubal factors, uterine/cervical and idiopathic infertility. Tubal factor constitutes 30-

35%. Most common causes include PID, use of IUCDs, ectopic and septic pregnancy, endometriosis and previous surgical trauma. Proper evaluation of the tubal pathology has become more significant in the present day obstetrics because of rising incidence of PID, abuse of antibiotics and recent appearance of resistant strain of Neisseria gonorrhoea. Multiple approaches to the diagnosis of tubal infertility includes: laparoscopy with chromopertubation, Hysterosalpingography, Sonohysterosalpingography, salpingoscopy and chlamydial serology. Hysterosalpingography (HSG) and laparoscopy with chromopertubation are the most commonly used methods to examine tubal patency. Bilateral proximal obstruction of the tubal cornua can occur because of cornual spasm during HSG, induced by the injection of dye during the procedure. Uterine contractions can also lead to transient spasms in the interstitial part of the fallopian tube, which can be mistaken for tubal obstruction during HSG, and this entity needs to be carefully distinguished from pathologic conditions. If the obstruction occurs in the middle or distal part of the fallopian tubes, an underlying pathologic condition is always present. Diagnosis of

fallopian tube obstruction based on HSG carries as high as 60% probability of actually patent fallopian tubes. This is the reason why bilateral proximal obstruction of uterine tubes diagnosed by HSG should be subsequently confirmed by laparoscopy. On the other hand, laparoscopy, gold standard test, is an invasive diagnostic method that requires general anesthesia and carries the risk of severe adverse effects, including injury of pelvic blood vessels, intestine and urinary bladder. It also does not provide an assessment of the uterine cavity. This implies the need for a diagnostic tool with high sensitivity and specificity to distinguish an actual fallopian tube obstruction from a seeming one and to decrease the need for laparoscopy. SonoHSG is a simple, safe, and well-tolerated examination technique used for investigation of the uterine cavity and fallopian tubes with very few adverse effects and a low occurrence of complications. It consists of an instillation of sterile saline through a Foley catheter inserted through the cervix with simultaneous transvaginal sonography. This method was shown to be a safe diagnostic procedure, and it has an effect in increasing spontaneous pregnancy rates. The sensitivity and specificity of SonoHSG are comparable with those of hysteroscopy in the diagnosis of uterine cavity anomalies. The clarity of images obtained during the procedure is comparable with that of magnetic resonance imaging. The risks of adverse effects during the procedure, itself are minimal. It may also be provided as an outpatient procedure. In this study, our goal was to determine the diagnostic value of SonoHSG for the diagnosis of tubal obstruction by comparison of SonoHSG and HSG with laparoscopic results.

MATERIALS AND METHODS

This descriptive analytical study was carried out in the Department of Obstetrics and Gynaecology, Assam Medical College and Hospital, Dibrugarh, from July 2011 to June 2012.

Study Population: One hundred infertile couples were selected and divided:

Group A: Hysterosalpingography (HSG) (50 Cases)

Group B: Sonohysterosalpingography (SonoHSG) (50 Cases)

Inclusion Criteria

All infertility patients attending OPD and consenting for Hysterosalpingography, Sonohysterosalpingography and diagnostic laparoscopy for the evaluation of infertility.

Exclusion Criteria

All infertile women, unwilling to undergo the procedures. Patients with male factor of infertility. Patients with contraindications for the procedures. The usual

contraindications are -

(1)HSG and SonoHSG

Current or recurrent pelvic inflammatory disease – TB, syphilis, etc. Active uterine bleeding. Palpable adnexal mass or tenderness in the pelvic area. History of recent surgical procedures of the pelvic organs. Allergic to contrast media (Limited to HSG)

(2)Diagnostic Laparoscopy:

Previous abdominal surgeries and radiation to abdomen and pelvis. Generalized peritonitis. Intestinal obstruction with significant hemoperitoneum. Severe cardiorespiratory diseases. Extremes of body weight etc.

Scheme of Case Taking

A detailed history of both the partners were taken. The patients were then subjected to initial routine investigations. After initial evaluation, tubal evaluation was done by either HSG or SonoHSG, after taking informed and written consent. The procedures HSG and SonoHSG were applied randomly, with first patient being subjected to HSG followed by alternate allotment to each group. Patient were then subjected to laparoscopic evaluation with chromopertubation under general anaesthesia after written and informed consent. All the 3 investigations were performed in the early follicular period, within 10 days, following menstruation.

Procedure of SonoHSG

Bimanual examination was performed initially followed by routine transvaginal sonography. Then vulva and cervix were cleaned with antiseptic solution. A speculum was inserted to visualize cervix. Anterior lip of the cervix was held with the vulsellum. Foley's catheter 8F held with a sponge holding forceps was then inserted into the uterine cavity. Sterile saline was flushed through the catheter to get rid of small amount of air before instillation. The balloon of the catheter was inflated with 1-1.5ml sterile saline just above internal os to form complete seal. The speculum was then removed and transvaginal probe was introduced in the posterior fornix. Instillation of sterile saline through the Foley catheter using a sterile 20-mL syringe was subsequently performed under sonographic guidance. Scanning was done in the long axis, fluid was instilled under vision, on the monitor and the transducer is moved from side to side i.e. one cornua to the other cornua. The amount of fluid instilled was variable and depended on the image that was produced on the ultrasound screen. The transducer was then rotated 90° into a coronal plane and further fluid was instilled by scanning down towards the endocervical canal and up towards the uterine fundus. The free flow of saline from both the tubes was taken as the criteria for tubal patency.

RESULTS

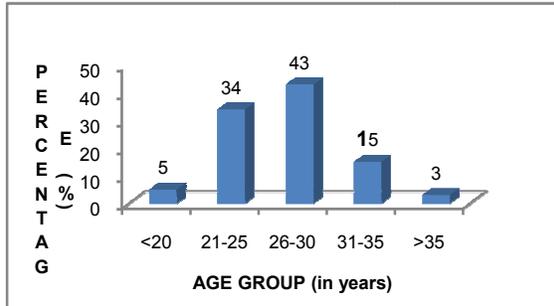


Table 1: Age distribution

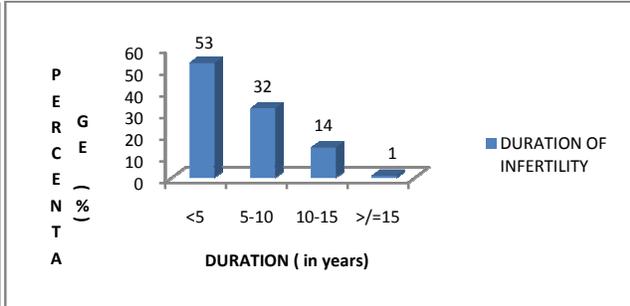


Table 2: Duration of infertility

Mean Age: 26.67 ± 4.15 years; Range: 19-37 years

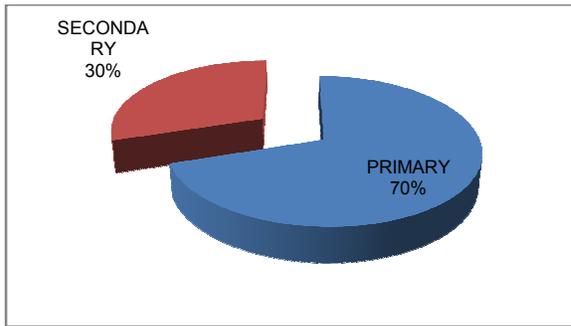


Table 3: Type of infertility

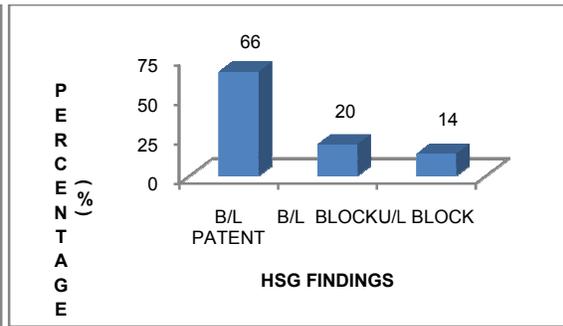


Table 4: Tubal findings on HSG

Mean Duration: 5.18 ± 3.25 years, Range: 2-15 years

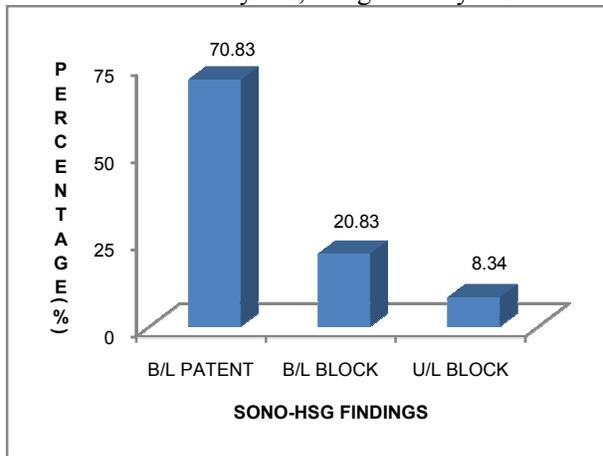


Table 5: Tubal findings on sono-HSG

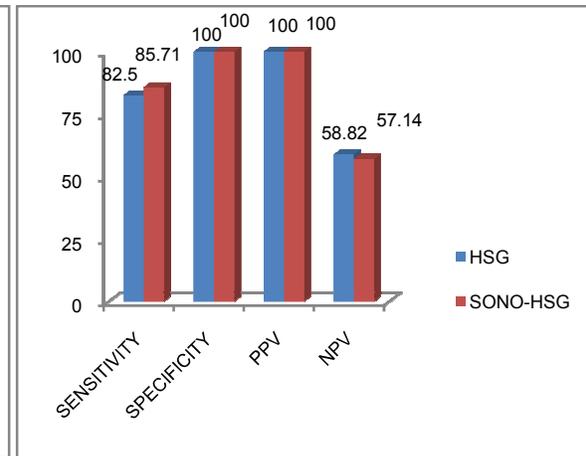


Table 6: Comparative evaluation of HSG and Sono-HSG

Table 1: Complications of HSG and Sono HSG

Complications	HSG		Sono HSG	
	N=50	%	N=50	%
Lower abdominal pain and discomfort	15	30%	10	20%
Fainting	1	2%	0	0%
Fever	1	2%	0	0%
Nausea and vomiting	5	10%	4	8%
Bleeding	3	6%	1	2%
None	25	50%	35	70%

HIGH complications rate seen with HSG. Failure rate of SonoHSG was 4% - Procedure could not be performed in

two patients due to severe pain not relieved with analgesics and due to patulous cervical os resulting in saline backflow through os.

DISCUSSION

Precise evaluation of the anatomy of uterine and fallopian tubes is an important step in a routine infertility assessment. Accurate diagnosis of anatomic abnormalities that may hinder fertilization plays an important role in both infertility screening and the consideration of available therapeutic options. Tubal pathologic conditions are responsible for 30 – 40 % of infertility cases, but according to the data obtained from our study, tubal factor has been found to be the cause in 17% of all patients. It may be due to difference in sample size of population studied. Hysterosalpingography and laparoscopy are the two classic examination methods in the assessment of tubal patency in infertile women, but in addition to the identified benefits, each method also carries the risk of severe adverse effects. HSG is still the primary investigative tool for tubal patency. It is done as an outpatient procedure, does not require general anaesthesia, and enables to outline the uterine cavity and fallopian tubes and detects site of block. Nevertheless this procedure is rather painful, time consuming, involves radiation exposure and carries the risk of reaction to contrast media. Laparoscopy is comparatively, a more invasive procedure that requires general anaesthesia. It does not provide any information about the cavity of the fallopian tubes and the uterus. It is associated with the risk of accidental injury of the pelvic viscera and pelvic blood vessels. But this method provides valuable information about the pelvic anatomy, so it is the best technique for diagnosis of tubal and peritoneal disease. The role of ultrasound in investigating infertility is well established. In 1984, the ultrasonic evaluation of uterine cavity and fallopian tubes with injection of normal saline was introduced and first described by Nannini *et al*, Randolph *et al* and Richman *et al*. Sharma also did abdominal sonography for tubal evaluation, with limited success. With advent of transvaginal transducers with higher frequency, genital organs can be better visualized. It also allows in evaluation of tubal patency. In the present series, we have observed 84% agreement between HSG and laparoscopy in the diagnosis of tubal patency or blockage, similar to that of Philipson *et al* (1981)-83.3% and Swodin *et al* (1984)-84% study. Sonohysterosalpingography can be provided as an outpatient procedure. It is associated with minimal patient discomfort and a low risk of infection. This procedure is noninvasive and rather easy to perform, as it does not require sedation or anaesthesia, nor does it have any severe procedure related complications and radiation

hazard. According to the currently available literature, the diagnostic accuracy of SonoHSG is comparable with that of hysteroscopy in the evaluation of the uterine cavity. SonoHSG allows evaluation of both the uterus and adnexa. Many previous studies have shown SonoHSG to have high sensitivity and specificity in tubal patency examinations. But it has certain disadvantages: intratubal pathology and site of blockage cannot be detected precisely. Peritubal adhesions and motility of tubes cannot be assessed properly. Findings are subjective and it requires a degree of technical competence. In Hydrosalpinx, tubal flow gives a false impression of tubal patency. Thus, in our study, SonoHSG had a sensitivity of 85%, specificity of 100%, PPV of 100% and NPV of 57.14% in the evaluation of tubal patency. Above results were found to be comparable with Iranian study, showed similar values as 94%, 100%, 100% and 75%, respectively. Agreement between SonoHSG and Laparoscopic findings was 84% in our study. Similar results were obtained in Peters and Coulam *et al*, Stern *et al* and volpi *et al* study. In our study out of 50 patients, 10 (20%) patients had mild pain. In study of Ertgrul *et al* out of 40 patients, 18 patients had tolerable pain, no medication was required for any case in their study. The failure rate in our study for the procedure was 4%. It is equal to the failure rate reported in literature: 4.6% to 7%. So, the results of this study show that SonoHSG is similar in efficacy with HSG in the evaluation of tubal blocks. On the basis of availability, accessibility, associated risks and costs, SonoHSG can be considered as the most efficient first-line diagnostic tool for evaluation of fallopian tube obstruction.

CONCLUSION

It can be used as screening procedure in initial work up of infertility i.e. if Sono-HSG shows a normal uterine cavity and patent fallopian tubes, invasive procedures like HSG or hysterolaparsocopy can be avoided. HSG and laparoscopy with CPT should be done only in cases where SonoHSG has detected any pathology of uterine cavity or fallopian tube or its findings are inconclusive. SonoHSG includes prior thorough evaluation of the pelvis by TVS, thus it is helpful in evaluating ovarian factors of infertility as well. This will help in reducing unnecessary laparoscopies, procedure related complications and healthcare costs.

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