

## ROUTINE SALINE INFUSION SONOHYSTEROGRAPHY PRIOR TO ASSISTED CONCEPTION: A REVIEW OF OUR INITIAL EXPERIENCE

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### ABSTRACT

Saline infusion sonohysterography has been employed to evaluate the uterine cavity prior to commencement of assisted conception. Intra-uterine lesions play an important role in the outcome of assisted conception procedures. A descriptive retrospective study of 760 patients who had saline infusion sonohysterography prior to assisted conception, between January 2008 and December, 2010. Forty-six percent of the patients had intra-uterine pathologies. Submucous fibroids accounted for almost half (48.57%) of the pathologies, followed by adhesions (28.57%) and endometrial polyps (22.86%). Complications arising from the procedure were minor and occurred in 26 patients (3.42%). Abdominal cramps, vaginal bleeding and vaginal discharge occurred in 14 (53.85%), 8 (30.77%) and 4 (15.38%) respectively. The average duration of the procedure was 6 minutes with a range of 4-9 minutes. Saline infusion sonohysterography is a reliable, cost effective and safe diagnostic tool in the evaluation of the uterine cavity prior to assisted conception.

**Keywords:** Routine, Saline infusion sonohysterography, Assisted conception, Experience.

### INTRODUCTION

The outcome of assisted reproductive technique largely depends on the receptivity of the endometrial lining of the uterus. Measures aimed at evaluating the uterine cavity prior to treatment are very vital for decision making and hence contribute to the overall success rate. The true prevalence of intrauterine lesions in infertile women is not known but some studies have reported an incidence of about 16–24%<sup>1</sup>.

Saline infusion sonohysterography (SIS) is variously referred to as sonohysterography, hysterosonography and transvaginal sonography (TVS) with fluid contrast augmentation<sup>2</sup>. It is a technique which involves the introduction of a catheter into the endometrial cavity and sterile saline subsequently instilled to separate the walls of the endometrium in order to visualize the endometrial cavity. The anechoic fluid is then juxtaposed against the echogenic endometrium, giving exquisite detail of the uterine lining.

Routine office hysteroscopy is a vital tool in the evaluation of the infertile patient. However screening with saline infusion sonohysterography yields similar diagnostic results but less invasive, better tolerated and less expensive<sup>3</sup>. Additionally with saline infusion sonohysterography, the adnexa can also be simultaneously evaluated. These advantages may warrant its routine use as a useful screening tool before in vitro fertilization<sup>2,3</sup>.

The objectives of this study are to evaluate the practice of routine saline infusion sonohysterography prior to assisted conception and to describe the findings and complications arising from the procedure.

### MATERIALS AND METHODS

A descriptive, retrospective study of all patients who had routine saline infusion sonohysterography, at a private fertility clinic, prior to in vitro fertilization, between January 2008 and December, 2010. A total of 760 patients had saline infusion sonohysterography and the relevant data were extracted from their records and analyzed using SPSS version 17. Descriptive data were presented in (%) for qualitative data and in the mean  $\pm$  SD and median (range) for quantitative data. The results of saline infusion sonohysterography were compared with hysteroscopy and the following were calculated for each examination: sensitivity, specificity, positive predictive value and negative predictive value.

### TECHNIQUE

The procedure was carried out between days 5-10 of the menstrual cycle in patients who were menstruating regularly. For postmenopausal women, it was carried out after a withdrawal bleeding was achieved following administration of provera (medroxyprogesterone acetate). This was to ensure that the test was done when the endometrium was thinnest and also to exclude early pregnancy. Bleeding was not a contraindication to performing saline infusion sonohysterography;

however, it was avoided whenever possible, as the blood clot could give false positive results.

Preparation for the examination involved counseling about the procedure and obtaining an informed consent. Ten milligram (10mg) hyosine bromide tablet was given 30 minutes before the procedure to minimize abdominal cramps. The instruments used for the procedure were: a sterile speculum with an open side, cervical sounds in the event that the catheter did not pass easily through the cervix, a 20-mL syringe, a tenaculum, and a Wallace classic embryo replacement catheter (Smith Medical) used to introduce the saline into the endometrial cavity.

The patient was placed in the lithotomy position, cleaned and draped. A sterile speculum was placed in the vagina, and the cervix was brought into view. The cervix was then cleansed with antiseptic solution. The Wallace classic embryo replacement catheter was placed at the external cervical os, and then advanced into the endometrial cavity. The speculum was carefully removed, and the transvaginal probe reinserted beside the catheter. Under transvaginal sonographic guidance (GE logiq 5 expert), approximately 10 to 30 ml of warm sterile saline was injected. Sonographic evaluation of the endometrial cavity was performed in both coronal and sagittal planes by the Gynaecologist trained in basic sonography. The catheter was then removed and the procedure completed. Prophylactic antibiotic with augmentin (amoxicillin/clavulanic acid) 625mg twice daily for 5 days was administered.

## RESULTS

A total of 760 patients had saline infusion sonohysterography during the period of study. The mean age of the study group was  $38.4 \pm 6.70$  years.

**Table 1:** Patient's demographics and duration of infertility

Variable	n	(%)
Age (years) (mean+SD)	38.4 ± 6.70	
BMI (Kg/m <sup>2</sup> ) (mean+SD)	24.0 ± 3.76	
<b>Infertility</b>		
Primary	128	16.8
Secondary	597	78.6
Unexplained	35	4.6
<b>Education (Highest level)</b>		
Primary	2	0.3
Secondary	45	5.9
Tertiary	713	93.8
<b>Duration of infertility (years)</b>		
1-4	228	30.0
5-9	342	45.0
10-14	137	18.0
≥15	53	7.0

**Table 2:** Sonohysterography findings/complications

Findings	n
Absent	411
Pathology	349
Submucous myoma	167
Intra-uterine adhesions	140
Endometrial polyps	41
<b>Complications</b>	
Abdominal cramps	14
Vaginal bleeding	8
Vaginal discharge	4
Average duration (minutes) (mean+SD)	6.1 ± 2.6

The mean body mass index was  $24.0 \pm 3.76$  Kg/m<sup>2</sup>. Majority of the patients (78.6%) had secondary infertility with varying duration. About 45% had durations between 5-9 years underscoring the undue delay in seeking assisted conception services in our environment. This however may be as a result of lack of sufficient funds for the procedure or poor knowledge about its availability. Over 90% of the patients had tertiary education and were literate.

**Table3:** Comparison with hysteroscopy.

Pathology	Sonohysterography	Hystero
Submucous myoma	168	173
Intra-uterine adhesions	140	144
Endometrial polyps	41	32

**Table 4:** Diagnostic accuracy parameters of SIS for submucous myoma, intra-uterine adhesions and endometrial polyps with respect to hysteroscopic diagnosis

	Sensitivity	Specificity	PPV	NPV
Myoma	0.96	0.95	0.95	0.96
Adhesions	0.93	0.97	0.97	0.95
Polyps	0.94	0.97	0.78	0.99

SIS, saline infusion sonohysterography, PPV, positive predictive value, NPV, negative predictive value

Clientele for assisted conception services in Nigeria mostly belong to the upper educated class of patients who are often gainfully employed and financially stable. Forty-six percent of the patients had identifiable intrauterine lesions. Submucous fibroids constituted almost half of the intrauterine lesions (48%) while endometrial polyps were the least detected lesions (12%). The diagnostic accuracy of saline infusion sonohysterography for fibroids and polypoid lesions

was in agreement with subsequent hysteroscopy findings (sensitivity of 96% and 94%, respectively).

Complications arising from the procedure were minor and not life threatening. Twenty six patients (3.42%) had complications as detailed in table 2. Abdominal cramp was the most encountered complaint and occurred in over half of the patients (53.8%). The average duration of the procedure was 6 minutes with a range of 4–9 minutes. Hence it can be adjudged a quick and safe screening tool.

## DISCUSSION

Saline infusion sonohysterography takes advantage of saline as a negative contrast agent during transvaginal scanning and utilizes the uterine distension properties of saline, to reveal structural anomalies of the endometrial cavity<sup>4</sup>. Since uterine abnormalities underlie infertility in close to 15% of patients seeking treatment, thorough diagnostic procedures, including modern imaging techniques in the evaluation of infertile women are important<sup>4</sup>. In this study, uterine abnormalities were found in 349 patients representing 46% of the study population. This further emphasizes the importance of uterine cavity evaluation before the commencement of assisted conception in the tropics.

The average age at presentation was  $38.4 \pm 6.7$  years with majority of the patients infertile for between 5-9 years, invariably allowing considerable idle time for uterine lesions to develop due to prolonged interval prior to conception. This may not be unrelated to the expensive cost of assisted conception in the tropics averaging about 6,000 US dollars per cycle. The practice of fee for service in the absence of health insurance is also an important contributor to delayed fertility treatment. Secondary infertility accounted for greater than three quarters of the study population in keeping with a high rate of infectious morbidity in the tropics coupled with an increased propensity to seeking unorthodox care.

The procedure lasted averagely 6 minutes and was done on an outpatient basis. As detailed earlier, instruments required for the procedure are relatively simple and generally disposable. However care must be taken to ensure good transvaginal probe hygiene by ensuring that the probe is covered with either a sterile probe cover or a latex male condom. It is our practice to use a latex male condom as protective covering in order to minimize cost.

Saline infusion sonohysterography has been performed with various catheters including a flexible sterile catheter, 2mm neonatal suction catheter<sup>5</sup>, 10 French

Nelaton catheter, 8–12-Fr Foley catheter and Cook soft 500 IVF transfer catheter<sup>6</sup>. However in this study, we used the Wallace classic embryo replacement catheter due to its availability, flexibility and ease of passage through the cervical os. Saline infusion sonohysterography also doubles as a mock embryo transfer procedure since the Wallace classic embryo replacement catheter is our preferred choice on the day of actual embryo transfer.

Complications arising from the procedure expectedly were minor and occurred in 26 patients (3.42%). Abdominal cramps being the most encountered despite routine administration of 10mg hyosine bromide, an antispasmodic drug that blocks the parasympathetic pathway with the onset of action taking 30 minutes from oral administration. Various studies have been done on the analgesic requirement for saline infusion sonohysterography and the major mechanism of pain was as a result of fluid distention of the uterine cavity, resulting in the local release of prostaglandins causing delayed rather than immediate pain<sup>7</sup>. However no statistically significant difference in pain relief was noted with the use of mefenamic acid or hyoscine bromide tablets<sup>7</sup>.

The diagnostic accuracy of saline infusion sonohysterography for submucous myoma, endometrial polyps and intrauterine adhesions was in marked agreement with hysteroscopy, the gold standard in the present study (sensitivity of 96%, 94% and 93%, respectively). A meta-analysis by Kroon *et al* in 2003 showed that the diagnostic accuracy of saline infusion sonohysterography equals the accuracy of diagnostic hysteroscopy<sup>8</sup>. From our study, saline infusion sonohysterography is a useful screening tool in evaluating the endometrial cavity with its high negative predictive value (NPV) for submucous myoma (96%), endometrial polyp (99%) and intrauterine adhesions (95%).

This study relied on data obtained from case records and may have been subjected to observer bias. However, a large number of patients were studied and observer errors may not contribute significantly to the outcome of study.

Various studies have evaluated saline infusion sonography and hysteroscopy and have been able to prove that it is quite accurate and cost effective as compared to hysteroscopy<sup>9,10</sup>. Its comparable findings with hysteroscopy, minimal risk, shorter duration of procedure and lower cost merits recommendation as an initial out-patient screening tool in infertility work up especially in the tropics.

## CONCLUSION

Saline infusion sonohysterography is a reliable, cost effective and safe out-patient screening tool for the evaluation of the endometrial cavity prior to assisted conception. It is less invasive, better tolerated and offers simultaneous evaluation of the adnexa at the same sitting. Routine use prior to assisted conception would serve as a filter mechanism to reliably and efficiently exclude intrauterine lesions, thereby influencing decision making and overall outcome of fertility treatment.

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