TRANSVAGINAL SALINE INFUSION SONOHYSTEROGRAPHY: INITIAL RESULTS

Maj J DEBNATH ^{*}, Lt Col L SATIJA ⁺,
Lt Col RK SHARMA [#], Maj V RASTOGI ^{**},
Col HARIQBAL SINGH ⁺⁺, Col RAKESH MOHAN ^{##},
Col SK KHANNA ^{***}

ABSTRACT

Transvaginal sonohysterography was carried out with dynamic instillation of normal saline in the uterine cavity in fourteen infertile patients. Sonohysterography was found to be simple, accurate and specific in delineating endometrial cavity lesions like polyp, submucosal myoma, intrauterine synechiae and endometrial hyperplasia.

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KEY WORDS: Infertility; Endometrial cavity pathology; Transvaginal sonohysterography.

Introduction

Hysterosalpingography has been traditionally used to delineate uterine cavity, although it is considered to be less specific. Hysteroscopy is considered to be gold standard in evaluating endometrial cavity lesions. Vaginal sonography has significantly influenced fertility management and greatly extended the role of ultrasound in obstetrics and gynaecology. The use of ultrasonography together with instillation of intrauterine saline (Sonohysterography) is an appealing alternative to hysterosalpingography (HSG) and hysteroscopy in the evaluation of endometrial pathologies. Sonohysterography (SHG) has been found sensitive, specific, and accurate in identifying abnormalities like myoma, polyp, synechiae, septae and uterine anomalies etc [1-3]. In this study we describe our initial experience of performing sonohysterography (SHG) in a limited number of infertility patients at a service hospital.

Material and Methods

During the months of Jan and Feb 1999, a total of 14 infertility patients underwent sonohysterography for varied indications (Table-1). Cases were selected on the basis of (i) focal hyperechoic abnormality/diffuse hyperechoic endometrium/heterogeneous endometrium on routine transvaginal evaluation of infertility patients (This was the commonest indication for sonohysterography), (ii) inconclusive HSG findings of uterine cavity abnormalities. All patients were briefed adequately about the simplicity and accuracy of the procedure and hence patient compliance was excellent. The procedure was conducted jointly by radiologists and gynaecologist. Sonohysterography (SHG) was performed in the follicular

phase of the menstrual cycle. We have used primarily dedicated double channel self retaining sonohysterography cannula (SHG cannula). In certain cases we have also tried Foley's catheter. In a very tight nulliparous cervix we have used infant feeding tube for cannulating cervix (Fig-1). The procedure was performed in the following steps (Fig-2):

Patient position:-supine with knees flexed.

Preliminary transvaginal sonography (TVS) for evaluation of endometrial and uterine anatomy.

Aseptic cleaning of vulvo-vaginal region.

Insertion of SHG cannula/Foley's catheter/infant feeding tube.

Reintroduction of TVS probe and localisation of catheter/cannula tip followed by inflation of the balloon under direct ultrasound visualisation.

Injection of sterile saline in a pulsatile fashion and looking for endometrial cavity/uterine pathology. With the balloon in place the endometrial cavity is examined in longitudinal as well as coronal

Fig. 1 : Cannula/catheter used for sonohysterography

^{*} Graded Specialist(Radiodiagnosis), Base Hospital, Barrackpore-743101, ⁺ Classified Specialist, ^{**} Trainee ⁺⁺ Senior Adviser, Department of Radiodiagnosis, Command Hospital (SC), Pune-411 040, [#] Reader, Department of Obstetrics and Gynaecology, Armed Forces Medical College, Pune 411 040, ^{##} Senior Adviser (Radiodiagnosis), Command Hospital (EC), Calcutta 700 027, ^{***} Senior Adviser (Radiodiagnosis), Army Hospital(R&R), Delhi Cantt.

Fig. 2 : Schematic diagram showing sonohysterography procedure (a) Channel for saline, (b) Channel for bulb, (c) SHG cannula, (d) TVS probe

Fig. 3 : Intrauterine synechia after instillation of saline

Fig. 4a : Endometrial polyp on TVS

plane. In most cases, 10-15 ml of saline is sufficient to demonstrate the endometrial cavity. The inflated balloon does not permit retrograde flow of saline through the cervix and hence allows a prolonged examination of the endometrial cavity.

Gradually deflate the balloon and slowly withdraw the catheter/cannula while still injecting saline. This allows visualisation of internal os and cervical canal.

Take out the cannula/catheter and the TVS probe.

Fig. 4b : Endometrial polyp after instillation of saline

Fig. 5 : Submucosal fibroid indenting uterine cavity

Fig. 6 : Endometrial fibroid indenting uterine cavity

Results (Table-1)

Majority (n=12, 86%) of our patients were between 21-30 years of age. Primary infertility constituted 10 (71%) cases. 8(57%) patients complained of mild degree of pain during distension of balloon/instillation of saline distending the uterine cavity. This pain was transitory and subsided after the procedure was over. One (7.14%) patient complained of persistent moderate backache for 4-5 days following the procedure. This was managed as a case of pelvic inflammatory disease. In 2 (14.28%) primary infertility cases with very tight cervix, we had to use infant feeding

TABLE 1
Summary of cases

Sr. No	Age	Prim/Sec Infertility	Cannula/ Catheter	Indication for SHG	Findings of SHG	Hysteroscopy
1.	23	P	Foley's	Abnormal uterine bleeding Hyperechoic thickened endometrium on TVS (ET-20 mm)	Hyperplastic endometrium. Endometrial polyp	Confirmed
2.	25	P	SHG cannula	Filling defects on HSG (inconclusive)	Normal uterine cavity	
3.	26	P	SHG cannula	Suspicion of single tubal patency (one tube already removed). Inconclusive HSG findings of uterine cavity.	Normal uterine cavity. Significant fluid collection in POD post HSG (indirect evidence of tubal patency).	
4.	30	S	SHG cannula	Secondary amenorrhoea for 2 yrs.	Synechiae in the uterine cavity and cervical canal	Confirmed
5.	24	P	Infant feeding tube	Filling defect in HSG	Uterine synechiae.	
6.	21	P	SHG cannula	Focal hyperechoic endometrial lesion on TVS.	Endometrial polyp	Confirmed
7.	28	S	SHG cannula	Secondary amenorrhoea Inconclusive HSG.	Uterine synechiae	Confirmed
8.	25	P	Foley's	Focal hyperechoic lesion close to endometrium on TVS.	Submucosal fibroid indenting endometrial cavity	
9.	30	S	Foley's	Small uterine cavity on HSG with bilateral tubal block	Normal uterine cavity. Significant fluid collection in POD post HSG (indirect evidence of at least one patent tube)	
10.	29	P	SHG cannula	Focal hyperechoic lesion of endometrium on TVS	Endometrial polyp	Confirmed
11.	38	P	Foley's	Filling defects on HSG Heterogeneous hyperechoic endometrium on TVS	Intrauterine synechiae	Confirmed
12.	38	S	Foley's	Abnormal uterine bleeding Focal hyperechoic lesion on TVS	Submucosal myoma	Previous Hysteroscopy was normal
13.	24	P	Infant feeding tube	Heterogeneous endometrium on TVS	Intra uterine synechiae	
14.	21	P	SHG cannula	Abnormal uterine bleeding Thickened endometrium on TVS	Endometrial hyperplasia	Confirmed
				<i>Total cases 14 Primary infertility = 10 Secondary infertility = 04</i>	<i>Synechiae = 05 Endometrial polyp = 03 Submucous myoma = 02 Normal uterine cavity = 02 Hyperplastic endometrium = 02</i>	

tube. Sonohysterography resulted in excellent discrimination of endometrial cavity detail. Abnormalities found during the sonohysterography were given the following diagnoses:

Synechiae (n=5) (Fig-3), endometrial polyp (n=03) (Fig 4a and b), submucosal fibroid (n=02) (Fig-5), endometrial hyperplasia (n=02) (Fig-6). Normal uterine cavity was found in 02 cases where previous HSG was inconclusive. In one case where one tube was already removed and patency of the remaining tube was in doubt on HSG, sonohysterography indirectly proved patency of the tube by observing significant fluid collection in pouch of Douglas after the procedure (pre-procedure TVS did not reveal any fluid in pouch of Douglas). In one patient of secondary infertility where previous hysteroscopy was normal, sonohysterography revealed a large submucous myoma.

Discussion

Structural abnormalities of the uterus and endometrial cavity may affect reproductive outcome adversely by interfering with implantation and causing spontaneous abortion. With the introduction of trans-

vaginal probes in early eighties, it became possible to obtain images of finer endometrial detail and uterine pathologies. The transvaginal probe contributes to an increased diagnostic accuracy through improved resolution afforded by the proximity of the transducer to the target organs and by the higher transducer frequencies used producing better axial and lateral resolution. Despite tremendous improvement in visualisation of endometrial changes and uterine pathologies with TVS, it is extremely difficult to demonstrate intra-uterine adhesions. It is equally difficult at times to differentiate between submucous myoma, endometrial polyp and proliferative endometrium. Distending the uterine cavity with saline coupled with simultaneous real time visualisation of the uterine cavity with a transducer (Sonohysterography) results in excellent discrimination of uterine cavity detail. Randolph et al

TABLE 2
Comparison among Hysterosalpingography, Hysteroscopy and Sonohysterography

Procedure	Advantage	Disadvantage
HSG	Easy to perform. Tubal lumen can be delineated with tubal patency test.	Low specificity. Use of ionising radiation. Use of iodinated contrast media with potential for allergic reaction. Inability to study adnexa and myometrial pathology accurately.
Hysteroscopy	High specificity Therapeutic option available.	Invasive procedure. Requires local/general anaesthesia in OT. Inability to study myometrial and adnexal pathologies.
SHG	Easy to learn and perform. Reasonably sensitive, specific and accurate. Can be performed as an OPD procedure. Simultaneous evaluation of endometrial cavity, myometrium and adnexa possible. Use of saline eliminates risk of allergic reaction to contrast media.	

TABLE 3
Comparison of Cannula/Catheters used for Sonohysterography

Cannula/Catheter	Advantage	Disadvantage
Double channel SHG cannula	Rigid in its tip and is relatively easy to push through the cervix. Self retaining balloon can be inflated in the cervix and it does not obscure visualisation of uterine cavity and upper cervical canal. The cannula tip can be maneuvered in a hinge like fashion there by keeping the uterus in the optimum plane for best visualisation.	The space available for TVS probe becomes limited and it restricts the mobility of the probe. The cannula has to be sterilised after every use and hence only one procedure can be done at a time. Limited availability of the cannula (may not be a problem in future).
Foley's catheter	Readily available in sterile pack. Adequate space available for maneuvering TVS probe. More than single case can be done in the same sitting.	The bulb inflated in the uterine cavity partly obscures the ROI. Tip of the Foley's catheter is unduly long and again obscures part of ROI. Nulliparous cervix may not allow passage of a Foley's catheter. Very difficult to evaluate upper cervical canal.
Infant feeding tube	Can be introduced in a narrow cervical canal. Does not obscure too much of ROI.	Very difficult to retain within the uterine cavity with frequent expulsion during the procedure. Retrograde flow of saline along the wall of the tube makes it difficult to distend the uterine cavity with saline.

[1] in 1986 described instillation of intra-uterine saline during transabdominal ultrasound evaluation and found that the findings correlated well with hysteroscopic findings. Parson and Lense [3] evaluated 39 patients with vagino sonohysterography and found that sonohysterography (SHG) resulted in excellent discrimination between intracavitary, intramural and diffuse processes. Various studies confirmed that SHG can easily identify normal uterine cavity, endometrial polyp, intrauterine adhesions, submucous or intramural myomas and other uterine pathologies [1-5].

During routine evaluation of infertility patients at our centre, we were at times confronted with focal/diffuse hyperechoic endometrium on TVS. There were occasions when HSG findings were equivocal. Influenced by the positive results of SHG published worldwide we decided to perform a few cases to see the results. Although the number of cases in our study are limited, the results are gratifying and equally encouraging. There was one case who in addition to secondary infertility had menorrhagia; where previous hysteroscopy was normal. Sonohysterography re-

vealed a large submucous myoma in this case. In this particular case sonohysterography scored over hysteroscopy. The sensitivity, specificity and accuracy of sonohysterography is established worldwide [1-4,6,7]. Our initial experience confirms the same although all cases did not undergo hysteroscopy. The relative advantage and disadvantage of HSG, hysteroscopy and SHG are discussed in Table-2. Our experience of using the three types of cannula/catheter is discussed in Table-3.

The rate of complications of SHG is not more than HSG and hysteroscopy. Sonohysterography not only delineates endometrial cavity detail but also myometrial and adnexal detail, an information which cannot be achieved with HSG or hysteroscopy. SHG can be easily performed as an OPD procedure without any analgesia/anaesthesia. We, therefore, recommend the routine use of sonohysterography for uterine screening in infertility treatment programme.

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