

## TRANSVAGINAL SONOSALPINGOGRAPHY VERSUS HYSTEOSALPINGOGRAPHY AND LAPAROSCOPIC CHROMOPERTUBATION- A COMPARATIVE EVALUATION FOR DETERMINATION OF TUBAL PATENCY

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### ABSTRACT

#### BACKGROUND

The aim of this study was to assess usefulness of sonosalpingography in determining role of tubal factor in cases of infertility as an initial measure as compared to hysterosalpingography and diagnostic laparoscopy.

#### MATERIALS AND METHODS

This was a descriptive study conducted over a period of 9 months. 50 patients with infertility attending the infertility clinic in OPD of Obstetrics and Gynaecology were evaluated clinically with detailed history. All patients were subjected to sonosalpingography, hysterosalpingography and laparoscopy and the findings were documented.

#### RESULTS

There were 40 cases (80%) with primary infertility and 10 (20%) with secondary infertility. Sonosalpingography has 94.87% sensitivity rate with laparoscopic chromopertubation as reference standard whereas hysterosalpingography has 87.17% sensitivity rate. Laparoscopy has better diagnosis rate than HSG and sonosalpingography in pelvic pathologies.

#### CONCLUSION

Sonosalpingography is a simple office noninvasive procedure having slightly better diagnostic value than HSG and somewhat similar to laparoscopy for determining tubal patency. We conclude that all patients with infertility should undergo sonosalpingography as an initial measure to assess tubal patency as part of their primary workup of infertility.

#### KEYWORDS

Infertility, Sonosalpingography, HSG, Diagnostic Laparoscopy, Tubal Patency.

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#### BACKGROUND

Infertility has not only been a source of personal misery, a cause of disgrace and divorce since ancient times. It continues to be a major medical and social problem even today. Infertility affects nearly 10-15% of couples and is an important part of clinical practice.<sup>1</sup> Leading causes of infertility include tubal disease, ovulatory disorders, uterine or cervical factors, endometriosis and male factor infertility. The female factor contributes most (i.e. 40-45%) to aetiologies of infertility followed by male factor (32-40%), both partners (10%) and unexplained (10%).<sup>2</sup>

The Tubal factors contribute almost 40-45% cases of female infertility. The appropriate selection of investigations based on problem areas identified by history and physical examination would guide the gynaecologist in the management of infertile couples. Diagnostic laparoscopy is invasive and has its share of morbidity and sometimes mortality also. HSG requires the patient to be subjected to radiation.

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Sonosalpingography is a simple non-invasive procedure to determine tubal patency. Our study assesses tubal patency by all the three methods and compares the observations.

#### MATERIALS AND METHODS

This is a descriptive study, carried out in the Department of Obstetrics and Gynaecology at Indira Gandhi Government Medical College and Hospital Nagpur over a period of 9 months. 50 patients with female factors of infertility attending the infertility clinic in OPD of Obstetrics and Gynaecology were selected and informed about the study and risk associated with it. Study subjects were evaluated clinically with detailed history. All patients were subjected to sonosalpingography, hysterosalpingography and laparoscopy and the findings were documented.

Sonosalpingography was done on sixth or seventh day, HSG on eighth or ninth day and diagnostic laparoscopy with chromopertubation was done on twenty first to twenty third day of menstrual cycle.

#### Procedure of Sonosalpingography

Informed written consent was obtained after explaining the procedure. Using all aseptic precautions sterile normal saline was instilled in uterine cavity through a no 10 Foley's catheter placed just above the internal os during transvaginal sonography. The catheter balloon was distended with 3 ml of normal saline to avoid retrograde leakage through vagina.

The uterus was scanned and the entire endometrial cavity delineated. Tubes were inspected for spillage. Prophylactic antibiotic course was given.

**RESULTS**

**Table-1**

		<b>Primary Infertility</b>	<b>Secondary Infertility</b>
Age (years)	Range	20 - 37	24 - 35
	Mean	26.8	28.75
Duration of Infertility (years)	Range	2-13	2-15
	Mean	5.11±2.61	5.13±2.88
<b>Total No. of patients</b>		<b>40</b>	<b>10</b>

*Table 1. Distribution of study subject according to age, duration of infertility*

In this study the maximum number of cases 23 (46%) were in the age group 21-25 years. There were 40 (%) cases of primary infertility and 10 cases (20%) of secondary

infertility. Most cases were with duration of 3-5 years of infertility.

**Table-2**

<b>Test</b>	<b>Both Tubes Patent</b>	<b>Bilateral Tubal Blockage</b>	<b>RT tube Patent</b>	<b>LT tube Patent</b>
Sonosalpingography	37	4	4	5
Hysterosalpingography	34	6	3	7
Laparoscopic chromopertubation	39	3	3	6

*Table 2. Distribution of study subjects according to tubal patency (n=50)*

In the present study sonosalpingography has 94.87% sensitivity while HSG recorded a slightly less 87.17% sensitivity rate.

In 1 case, we got false positive result in right tube because of the presence of hydrosalpinx. The tube was patent on

sonosalpingography but blockage was seen in laparoscopy and HSG. The flow of saline through the dilated tubes may look like spillage on sonography. In 1 case false negative result was obtained which may be due to cornual spasm, mucus blockage or technical error.

**Table-3**

<b>Findings</b>	<b>Laparoscopy</b>	<b>Hysterosalpingography</b>	<b>Sonosalpingography</b>
Hydrosalpinx	5	2	3
Tubo ovarian mass	1	0	2
Endometriosis	3	0	2
Polycystic ovary	2	0	1
Ovarian cysts	3	0	3
Peritubal adhesions	3	0	0
<b>Total</b>	<b>17</b>	<b>2</b>	<b>11</b>

*Table 3. Distribution of study subjects according to other associated pelvic findings*

Laparoscopy was found to be far more efficient in detecting pelvic pathologies as compared to both HSG and sonosalpingography.

**DISCUSSION**

There are few subjects of late that have evoked more debates, discussions and disagreements in gynaecology than the evaluation and management of the infertile couple. Age is an important factor for the prediction of chances for spontaneous conception in both untreated patients and patients who are being treated for infertility. Fertility in women peaks between the ages of 20 and 24, decreases relatively little till the age of 30 and then declines progressively.<sup>3</sup> In this study the maximum number 23 cases (46%) were in the age group 21-25 years. Similar findings were seen by Kanal P and Sharma S<sup>4</sup> and Boricha Y et al<sup>5</sup> who quoted maximum cases of infertility (45%) in age group of 21-25 years and 42.85% in the age group of 21-25 years respectively.

Mehreen B et al<sup>6</sup> revealed that maximum number of patients (45.71%) presented with 2-5 years of infertility, similar to our study. Less than 10 years duration of infertility did not significantly affect the conception rate in patients undergoing treatment for infertility. However, duration longer than 10 years showed an exponential decrease in

conception rates according to a study by Dechanet et al<sup>7</sup> Similar findings were reported by a study by Wilkes et al.<sup>8</sup>

On comparing the results of sonosalpingography, HSG and laparoscopy we found that the sensitivity of sonosalpingography is 94.87% and of HSG is 87.17%. Kore et al<sup>9</sup> also found that when results of sonosalpingography were compared with those of laparoscopy 97% correlation was noted whereas there was 93% correlation between the results of HSG and laparoscopy. Seal Subrata Lall, et al<sup>10</sup> also in their study found that sonosalpingography has 97.3% sensitivity and HSG has 94.6% sensitivity in comparison to laparoscopic chromopertubation. Yasmeeen Usmani et al<sup>11</sup> found that sonosalpingography has a sensitivity of 86.6% when compared with laparoscopy in the assessment of tubal patency.

In the study by Preeti Deshpande et al<sup>12</sup> they found that there was complete agreement in 90% cases, partial agreement in 6.6% cases and total disagreement in 3.3% cases. Rubin in 1920 introduced the tubal insufflation test using CO2 to investigate tubal patency. Subsequently HSG was the method of choice more so after the advent of water soluble contrast media.

**HSG has certain disadvantages-**

- A. Detects only the endotubal pathology.
- B. Sometimes causes allergic manifestations and reactions to the drug used.
- C. Known hydrosalpinx, acute PID, cervicitis and adnexal mass all are contraindications.
- D. Exposes women to radiation.

Since the advent of ultrasound, it is being used in the treatment of infertility. Nannini et al<sup>13</sup> Richman et al<sup>14</sup> and Randolph et al<sup>15</sup> were the pioneers of using exogenous contrast medium for ultrasound visualisation of the internal genital tract.

Laparoscopy is currently regarded as the most reliable tool in the diagnosis of tubal causes of subfertility. Since laparoscopy visualises the morphological abnormalities of fallopian tubes directly, it is generally accepted as the reference standard for determination of the accuracy of other diagnostic tools such as HSG or Chlamydia Ab testing for tubal pathology.

**Laparoscopy has its own Concerns also-**

- A. It is an invasive procedure.
- B. Has risks of anaesthesia.
- C. Requires preoperative investigations.
- D. Admission.
- E. Mental preparation of the patient for the procedure.

HSG has the advantage of detecting the site of blockage, isthmica nodosa, benign polyps and tubal endometriosis.

Transvaginal transducer of high frequency allows better visualisation of the genital organs. It also allows evaluation of tubal patency. Sonosalpingography has also certain advantages. It is an outpatient procedure, less time consuming and cost effective. It is a noninvasive procedure and does not require anaesthesia and operation theatre. It carries no radiation hazards and avoids allergic reactions seen with HSG. Tubal patency can be shown to patients in real time. It is reliable for assessment of tubal patency. It helps in the diagnosis of uterine anomalies and pelvic pathologies.

Sonosalpingography has its limitations as well. Tubal spasm may lead to diagnosis of tubal occlusion. Tubal flow may give a false impression of tubal patency in hydrosalpinx. Intratubal pathology cannot be detected. Site of blockage cannot be detected precisely. Peritubal adhesions and motility of the tubes cannot be assessed properly.

Combining sonosalpingography with transvaginal sonography provides a fair insight to diagnose other causes of infertility also in addition to diagnosing tubal patency. It may also be used to assess tubal status after microsurgery for anastomosis and is clearly indicated in patients with no history of reactions to iodinated contrast material.

Ayida and co-workers<sup>16</sup> have suggested that laparoscopy and chromopertubation have no place as a primary test for tubal patency in a non-complicated patient (A patient without a history of pelvic inflammatory disease, endometriosis or genital tract anomaly).

Thus, sonosalpingography offers a much less invasive method of diagnosing tubal patency while maintaining a high sensitivity similar to that of laparoscopic chromopertubation. Moreover, sonosalpingography can be done for patients who have bronchial asthma or cardiac problems and are temporarily unfit for surgery.<sup>17,18,19</sup>

**CONCLUSION**

Sonosalpingography is a simple, cost effective, non-invasive procedure for testing tubal patency and should be employed as initial test to assess tubal patency. If any abnormality is detected on sonosalpingography, HSG or laparoscopy can be done for confirmation.

**REFERENCES**

- [1] Mosher WD, Pratt WF. Fecundity and infertility in the United States: incidence and trends. *Fertil Steril* 1991;56(2):192-3.
- [2] Padubidri VG, Shirish DN. The pathology of conception. *Shaw's text book of gynaecology*. 12<sup>th</sup> edn. BI Churchill Livingstone, New Delhi 1983:154-68.
- [3] Maroulis G. Effect of aging on fertility and pregnancy. *Seminars Reprod Endocrinol* 1991;9:165.
- [4] Kanal P, Sharma S. Study of primary infertility in females by diagnostic laparoscopy. *Internet Journal of Medical Update* 2006;1(2):7-9.
- [5] Boricha Y, Sharma R, Boricha B, et al. Laparoscopy in 50 infertile couples: prospective study. *International Journal of Medical and Clinical Research* 2011;2(2):63-6.
- [6] Mehreen B, Batool WS, Tahir KM. Diagnostic significance of laparoscopy in infertility & identification of various unsuspected factors associated with infertility in females. *J Pharm Sci & Res* 2010;2(8):499-505.
- [7] Dechanet C, Belaisch-Allart J, Hédon B. Prognosis criteria for the management of the infertile couple. *J Gynecol Obstet Biol Reprod* 2010;39(8 Suppl 2):S9-26.
- [8] Wilkes S, Chinn DJ, Murdoch A, et al. Epidemiology and management of infertility: a population-based study in UK primary care. *Family Practice* 2009;26(4):269-74.
- [9] Kore S, Hegde A, Nair S, et al. Sonography for assessment of tubal patency: our experience. *J Obstet Gynecol India* 2000;50(2):63-6.
- [10] Lalls SS, Debdelta G, Debda S, et al. Comparative evaluation of sonosalpingography hysterosalpingography and laparoscopy for determination of tubal patency. *J obstet gynecol India* 2007;57(2):158-61.
- [11] Usmani Y, Pandey VD, Ekrumullah, et al. A comparative study between sonosalpingography and laparoscopic chromopertubation for tubal evaluation. *Sch J App Med Sci* 2016;4(6F):2266-70.
- [12] Deshpande P, Deshpande S. Sono Hysterosalpingography shsg: a useful adjuvant in infertility evaluation. *Jemds* 2015;4(10):1628-33.
- [13] Nannini R, Chelo E, Branconi F, et al. Dynamic echohysteroscopy: a new diagnostic technique in the study of female infertility. *Acta Eur Fertil* 1981;12(2):165-71.
- [14] Richman TS, Viscomi GN, deCherney A, et al. Fallopian tubal patency assessed by ultrasound following fluid injection. *Work in progress. Radiology* 1984;152(2):507-10.
- [15] Randolph JF, Ying YK, Maier DB, et al. Comparison of real time ultrasonography, hysterosalpingography, and laparoscopy/hysteroscopy in the evaluation of uterine abnormalities and tubal patency. *Fertil Steril* 1986;46(5):828-32.

- [16] Ayida G, Chamberlain P, Barlow D, et al. Is routine diagnostic laparoscopy for infertility still justified? A pilot study assessing the use of hysterosalpingo-contrast sonography and magnetic resonance imaging. *Hum Reprod* 1997;12(7):1436-9.
- [17] Kiyokawa K, Masuda H, Fuyuki T, et al. Three dimensional hysterosalpingo-contrast sonography as an outpatient procedure to assess infertile women: a pilot study. *Ultrasound Obstet Gynecol* 2000;16(7):648-54.
- [18] Bonammy L, Marett H, Perotin F, et al. Sonohysterography: a prospective survey of results and complications in 81 patients. *Eur J Obstet gynaecol reproductive Biology* 2002;102(1):42-7.
- [19] Zvanca M. Infertility investigation through saline infusion sonohysterosalpingography. *MAEdica- A Journal of Clinical Medicine* 2007;2(1):10-7.