

Comparison of sonosalpingography and laparoscopy in evaluation of tubal patency in infertility patients

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Abstract-

OBJECTIVE: To assess sonosalpingography whether it can be used to test tubal patency in infertility patients which is less invasive instead of diagnostic laparoscopy with chromopertubation which is associated with many complications?

METHODS: Total 60 patients attending Gynaec OPD were studied. 2 groups, each of 30 patients were randomly selected. One group underwent sonosalpingography and other group underwent diagnostic laparoscopy with chromopertubation. Results were analyzed to compare both groups.

RESULTS: Tubal non patency was found more often on sonosalpingography than on diagnostic laparoscopy with chromopertubation. However subsequent diagnostic laparoscopy, non-patency came only in one case

CONCLUSION: Sonosalpingography is simple, less invasive, can be done routinely on OPD basis, but tubal block suspected on sonosalpingography, needs confirmation by diagnostic laparoscopy.

Index Terms- Infertility, laparoscopic chromopertubation, sonosalpingography(SSG), tubal factor.

INTRODUCTION

In India, which is already overpopulated, we are trying very hard to check increase in population. At the same time female infertility is still a baffling problem which we have to face. Main causes of infertility in women include anovulation, a tubal or peritoneal factor, uterine, cervical, and idiopathic factors. The role of a tubal factor in infertility is increasing, and currently, it determines 30% to 35% of all infertility cases⁵ There are multiple etiologic factors responsible for the involvement of the fallopian tube in infertility, which include tubal damage from pelvic inflammatory disease (PID), Endometriosis, the use of intrauterine devices, a history of a perforated appendicitis, ectopic pregnancy, and septic abortion. Tubal adhesions and tubal obstruction can result in infertility.

The problem of diagnosing and correcting the tubal obstruction in infertile patient continues to be challenging one.

Briefly the main function of tubal factor is depends on fimbrial motion, peristalsis and patency. Malfunction of this may be due to many causes.

Ever since Rubin¹⁴⁻¹⁷ described the tubal insufflation test in 1920 by using carbon dioxide numerous methods have been developed

for evaluation of factors. Hysterosalpingography (HSG) and laparoscopic chromopertubation are widely employed. Laparoscopy is considered as gold standard for diagnosing tubal and peritoneal diseases. It allows visualization of all pelvic organ and permits detection and potential concurrent treatment of intramural and subserosal uterine fibroids, peritubal and periovarian adhesion and endometriosis. Direct visualization on laparoscopy using chromopertubation involves the transcervical instillation of dye such as indigo carmine or methylene blue to directly visualize tubal patency and fimbrial architecture. Recently the newer technique of sonohysterosalpingography popularly known as sonosalpingography (SSG) is evolved.

AIMS AND OBJECTIVES

The aims and objectives of the study are to compare the diagnostic laparoscopy and sonosalpingography in evaluation of tubal patency in infertility.

To compare the advantages and disadvantages, complications and time required for these procedures and to suggest suitable recommendations based on study findings.

MATERIALS AND METHODS

This is a prospective clinical Study.

60 women attending the gynecology OPD with primary and secondary infertility included in this study 30 in each group as study group. Patients selected randomly in each group.

Exclusion criteria were pelvic inflammatory disease, Patients which are surgically unfit and any major detected cause of infertility

These patients studied and evaluated in details with proper history taking, clinical examination and relevant investigations such as Hemogram, Blood Grouping and Rh Typing, Urine routine and microscopy, Ultrasonography in required cases, Husband semen analysis, HIV (ELISA) and VDRL in both partners after proper counseling, Thyroid function tests, HBsAg After these investigations respective procedures were done Diagnostic laparoscopy is a gold standard investigation for diagnosis of tubal patency. In Patient from sonosalpingography group suggesting tubal block (spillage is not seen) Diagnostic laparoscopy was performed on those patient. These two groups were compared according to the factors time required, comfort of patient, hospital stay and complications by statistical methods

TECHNIQUE

Sonosalpingography was done in mid proliferative phase (day 6-10 of a menstrual cycle), Oral analgesic, ibuprofen 400-600 mg may be given 1-2 h before the procedure. A detailed transvaginal ultrasound scan was done to assess the position of pelvic organs and to rule out any pathologies, which would come in the way of the procedure. Moreover, any free fluid in pelvis was also checked for.

The probe was removed and speculum was placed in the vagina to visualize the cervix. Vagina and cervix were cleaned with antiseptic solution. Foley's catheter no. 10 was introduced through cervix into the uterus. Balloon is distended with 2-3 ml of distilled water or normal saline and was placed just beyond the internal os. Once the catheter is fixed, tenaculum and speculum are removed and transvaginal probe is introduced into the vagina for further assessment.

Saline was injected through the catheter slowly. Scanning was done to assess the uterine cavity that was distended by saline and also passage of saline (fluid) seen through the tubes.. Once the procedure was completed, the instruments were removed. Patient was informed that she might get some pelvic cramping or spotting, but the symptoms are short termed and should not worry about it..

DIAGNOSTIC LAPAROSCOPY-

In the other group, Diagnostic Laparoscopy and chromopertubation along with endometrial biopsy was done on day 21 or 22 of the cycle. During laparoscopy the whole of the pelvis was first inspected and then diluted methelene blue was injected and the passage of the dye through the fimbrial ends of the tubes was looked for.

**TABLE NO :1
COMPARISON OF LAPAROSCOPIC
CHROMOPERTUBATION AND SONOSALPINGOGRAPHY
FOR TUBAL PATENCY**

	Tubes non patent	Tubes patent	Total	Chi square Df=1	P (one-tailed)
Laparoscopic chromopertubation (n = 30)	3	57	60	3.106	0.037
Sonosalpingography (n=30)	10	50	60		

**TABLE NO. 2
LAPAROSCOPIC FINDINGS IN PATIENTS WHO HAD
BILATERAL TUBAL BLOCK ON
SONOSALPINGOGRAPHY**

Patient 1	Bilateral fallopian tubes patent
Patient 2	Bilateral fallopian tubes patent
Patient 3	Bilateral fallopian tubes patent
Patient 4	Bilateral tubal block and extensive adhesions in pelvic structure s/o pelvic inflammatory disease
Patient 5	Bilateral fallopian tubes patent

**TABLE NO. 3
COMPARISON OF ABNORMALITIES FOUND DURING
DIAGNOSTIC LAPAROSCOPY AND
SONOSALPINGOGRAPHY**

Abnormality	Diagnostic laparoscopy	Sonosalpingo Graphy
Uterine	3	0
Pelvic adhesions	3	0
Fallopian tube abnormalities	1	0
Ovarian abnormalities	3	6
Endometriosis	1	0
Upper abdomen abnormality	1	0

TABLE NO. 4

COMPARISON OF SIDE EFFECTS OF DIAGNOSTIC LAPAROSCOPY AND SONOSALPINGOGRAPHY

Side Effects	Diagnostic laparoscopy	Sonosalpingo graphy
Nil	0	24
Nausea and vomiting	13	0
Pain in abdomen	30	6
Pain in shoulder	8	0

TABLE NO: 5

COMPARISON OF COMPLICATIONS OF DIAGNOSTIC LAAPROSCOPY AND SONOSALPINGOGRAPHY

Complications	Diagnostic laparoscopy	Sonosalpingo graphy
Nil	20	30
spinal headache	7	0
Crepitus(Subcutaneous emphysema)	2	0
intestinal perforation	1	0

TABLE NO 6

COMPARISON OF TIME REQUIRED FOR DIAGNOSTIC LAPAROSCOPY AND SONNOSALPINGOGRAPHY

Time required	Median time	Mean time in min	SD	Unpaired t	P
Diagnostic laparoscopy	45min	52.0	7.61	20.707	<0.001 HS
Sonosalpingo graphy	20min	21.5	2.67		

TABLE NO: 7

COMPARISON OF HOSPITAL STAY BETWEEN DIAGNOSTIC LAPAROSCOPY AND SONOSALPINGOGRAPHY

Hospital stay	Median stay	Mean Stay in days	Sd	Unpaired t	P
Diagnostic laparoscopy	3.0	3.23	0.430	41.168	<0.001 HS
Sonosalpingo graphy	0.0	0.0	0.0		

DISCUSSION:

A total of sixty patients of Infertility were studied at Tertiary Care centre for assessment of Tubal Patency. On 30 patients Sonosalpingography was carried out for assessment of Tubal Patency and in the remaining 30 patients Tubal Patency was assessed by Diagnostic Laparoscopy and chromopertubation.

Median Age of patients for Sonosalpingography was 26.97 years and that for Diagnostic Laparoscopy was 27.03 years. Both groups were comparable as there was no significant difference between median ages of two groups. Majority of patients were from group 25-29 years (63.33%). Primary Infertility was present in 44 out of 60 patients (73.33%) and the rest were suffering from Secondary Infertility (26.67%).

Table1: Bilateral tubal block was found in 1 case in diagnostic laparoscopy and in one case (3/60 (5%) fallopian tubes studied) unilateral tubal blockage seen (right fallopian tube non patent) rudimentary horn was present in this case. On the other hand, sonosalpingography found bilateral tubal block in 5 cases (10/60 fallopian tubes studied (16%)). The difference between these findings was statistically significant (p=0.037). Unilateral tubal blocks were not found on sonosalpingography

Tubal non-patency was found more often on sonosalpingography than on diagnostic laparoscopy. However in patients who underwent subsequent diagnostic laparoscopy (n=5), non-patency was confirmed only in one case. This indicates high rates of false positives for non-patency compared to the gold-standard laparoscopic technique. Therefore all non-patent fallopian tubes suspected on sonosalpingography should be confirmed by further evaluation with Laparoscopy.

Table 2: 5 cases of bilateral tubal block found on sonosalpingography underwent followup diagnostic laparoscopy. Tubal block could be confirmed only in one of these cases (20%).

Table 3: In our study, in 90% of the patients no uterine abnormality was found, However Bicornuate uterus was seen in 1 case (3%), fundal fibroid was seen in 1 case (3%) and rudimentary horn on right side was seen in 1 case (1%). This

indicates that Diagnostic Laparoscopy is better method to evaluate ovarian and uterine factors in infertility cases. Pelvic adhesions found in 2 cases (7.14%) which is suggestive of pelvic inflammatory diseases. Uterosacral ligaments are one of the most common sites for endometriosis. In present study we found Endometriotic patches in one case out of 30 cases (3.33%)

In present study, during Diagnostic Laparoscopy, endometriotic patches were seen on uterosacral ligament in 1 out of 30 cases (3.33%), adhesions on the uterosacral ligament were found in 1 out of 30 cases (3.33%) and in the remaining 28 out of 30 cases (93.33%) uterosacral ligaments were normal. Perihepatic adhesions were seen in 3 cases (10%) in diagnostic laparoscopy, suggesting Fitz-Hugh-Curtis syndrome. Bilateral tubes were normal in 29 cases out of 30. In one case bilateral tubal abnormality found. Tubes were congested and sacculations and peritubal adhesions were seen in this case. Bilateral tubal block was present with concurrently performed chromopertubation with methylene blue

Isao Tsuji et al¹ from Japan studied benefits of Diagnostic laparoscopy in patients with unexplained infertility. They found abnormality in 80.7% cases. Kanal et al² in 2006 studied 40 patients of infertility they found abnormality in 70% of cases on laparoscopy performed in infertile patients. Adhesions found in 44.5% cases. They found genital tract tuberculosis in 5% cases, endometriosis in 5% cases and hypoplastic uterus in 5% cases

In diagnostic laparoscopy out of thirty cases three are found to be having polycystic ovaries (10%) where ovarian drilling was done.

Seal Subrata Lall et al³ in their study found that ovarian cysts and polycystic ovary best detected by Diagnostic laparoscopy followed by Sonosalpingography followed by Hysterosalpingography

Table 4: Minor procedure adverse-effects: Minor adverse effects such as abdominal pain (7/30 – 23%), nausea and vomiting (15/30 – 50%) and shoulder pain (8/30 – 27%) occurred in diagnostic laparoscopy. In sonosalpingography, minor adverse effects such as abdominal pain (6/30 – 20%) were seen.

Table 5: Major procedure adverse-effects: In diagnostic laparoscopy, spinal headache occurred in 7/30 patients (23%), subcutaneous emphysema (2/30 patients – 7%) were seen Intestinal perforation requiring major surgery occurred in 1 case. In a large Finnish follow-up study, the major complication rate of diagnostic laparoscopy was 0.6 per 1000 procedures (Harkki-Sirenet al., 1999)⁴. Sonosalpingography was not associated with any major complications. Junjira Suttipichate et al⁴⁸ in their study found that adverse effects of Sonosalpingography include mild pelvic pain during Injection of saline through uterine cavity in 71.43% cases. In 4.76% cases patient complained of severe pelvic pain which was relieved by oral analgesics and rest. And in one case (2.38%) required medications for shoulder pain. No other immediate or remote complication was encountered.

A.K.P. Ranaveera et al⁵ in their study observed that only in 4.7% cases experienced significant pain during procedure requiring medications. And mild pain observed in many patients not requiring medications

Table 6: In present study 30 patients underwent Diagnostic laparoscopy at tertiary care centre. Mean time required for laparoscopy was 52 min and median time was 45 min. standard deviation was 7.61 min For Sonosalpingography mean time required was 21.5 min and median time was 20 min. Suttipichate et al⁶ in their study found that duration of sonosalpingography ranged from 5-12 min. Mean value was 7.52 min. Unpaired t-test applied to this data and p value was <0.001 which is highly significant.

Table 7: Mean hospital stay in Diagnostic laparoscopy in present study was 3.23 in days. Average stay is of 3 days whereas Sonosalpingography is OPD procedure. Hospital stay is not required in Sonosalpingography. Unpaired t test applied to this data and p value found to be < 0.001 which is highly significant.

CONCLUSION:

Our study shows that sonosalpingography is a simple, convenient and effective method in evaluation of fallopian tube patency. It is much less invasive than diagnostic laparoscopy. Procedure is associated with very few complications and can be done on an outpatient basis. However tubal block suspected on sonosalpingography needs confirmation by diagnostic laparoscopy. Furthermore sonosalpingography is not effective in the evaluation of uterine structural abnormalities, endometriosis, pelvic inflammatory disease, liver and ovarian pathology. In essence, sonosalpingography has good value as a screening test for tubal patency on OPD basis.

Limitations of study

Number of cases studied in this study are 30 in each procedure, which is a very small number, we need to do further studies on large number of cases so as to give conclusive results.

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