

Correlation between Trans-Vaginal Ultrasound and Endoscopy in Infertility

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ABSTRACT

Introduction: Infertility is defined as inability to conceive after one or more years of unprotected intercourse. This study was taken up to evaluate the correlation of trans-vaginal ultrasound with endoscopies both hysteroscopy and laparoscopy in the evaluation of infertile patients.

Material and methods: A prospective study was carried out in the department of Obstetrics and Gynaecology, MM Medical College and Hospital, Kumarhatti, Solan, HP, India for a period of 6 months from October 2017 to March 2018 conducted on 50 subjects.

Results: 50 patients were evaluated with diagnosis of primary and secondary infertility. TVS (Transvaginal scan) showed abnormal findings correctly in 38% of cases, and 62% cases were undiagnosed. Hysteroscopy showed alterations in 58% cases, predominantly uterine synechiae and endometrial polyp. There were no complications during hysteroscopy. Diagnostic Laparoscopy showed, normal pelvic findings and patent tubes in 30% cases of primary infertility and 8% cases in secondary infertility.

Conclusion: Hystero-Laparoscopy is better than TVS alone for the diagnosis of infertility pathology as its diagnosis is more precise and we can treat them simultaneously, but still TVS remains the best non-invasive method for study of uterine as well as adnexal pathology in infertility.

Keywords: Infertility, Transvaginal Ultrasound, Hysteroscopy, Laparoscopy.

INTRODUCTION

Infertility is a common condition, affecting 10 to 15 percent of reproductive-age couples. It is defined as the inability to conceive after one or more years of unprotected intercourse.¹ Although the prevalence of infertility is believed to have remained relatively stable during the past 40 years, the demand for infertility evaluation and treatment has increased.² The main causes of infertility include: Male factor 20%-30%, both male and female factors 10%-40%, female factor 40%-55% and unexplained infertility 10%-20%.³ The common factors responsible for infertility in females are anovulatory disorder, tubal factors, endometriosis, uterine and cervical factors.⁴ It is generally agreed that an infertility evaluation should be considered in any couple that has failed to conceive in 1 year. Investigations of infertile couple include a variety of tests. Transvaginal ultrasonography (TVS) is an excellent method for the study of internal genitalia.⁵ Hysteroscopy is considered the gold standard for uterine cavity evaluation because it allows for direct visualization.⁶ Laparoscopy is the gold standard for diagnosing tubal and peritoneal disease, tuberculosis, endometriosis and adhesions, because

no other technique provides the same degree of sensitivity and specificity.^{7, 8} It is also helpful in diagnosing uterine and ovarian factors. Hence diagnostic hysteroscopy and laparoscopy remains an essential part of full assessment of infertile couple.

This study was taken up to evaluate the diagnostic accuracy of TVS versus diagnostic hysteroscopy and laparoscopy in the infertile patients.

MATERIAL AND METHODS

This prospective observational study was carried out in the department of Obstetrics and Gynaecology, MM Medical College and associated Hospital, Kumarhatti, Solan, HP, India in a period of 6 months from October 2017 to March 2018 on 50 subjects. After taking informed and written consent, a detailed history, general and systemic examination was done. All the cases who underwent transvaginal sonography followed by diagnostic hysteroscopy and laparoscopy were included in the study. Further management was done according to the abnormality detected. All married females of 18 to 50 yrs suffering from primary or secondary infertility were included and couples using contraception and females non complaint with procedure and unfit for anesthesia were excluded from study. Transvaginal sonography (TVS) was done after obtaining proper consent. The uterine anatomy and the adnexae were visualized using a 7.5 MHz vaginal probe transducer. A specific note was made of any focal lesion seen in terms of impression of an endometrial polyp, submucous fibroid, intramural fibroid, or suspicion of hyperplasia. Diagnostic Hysteroscopy and Laparoscopy were done in endoscopic O.T on an inpatient basis in the post menstrual phase. The procedure was done under general anesthesia after baseline investigations (complete blood count, blood sugar, kidney and liver function tests, ECG, chest X-ray) were performed as per our institutional protocol for pre anaesthetic check-up. Tablet misoprostol 400 µgm

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(per vaginum or sublingual) was administered about two hours prior to the procedure for cervical priming excluding cases with history of asthma, heart disease, epilepsy and glaucoma.

Procedure

The patient was placed in lithotomy position. After proper painting, draping, uterine sound was then introduced into the cervix to confirm the position of the uterus and measure the uterocervical length. The hysteroscope was then gently introduced into the cervical canal through external os and then into uterine cavity under vision. A systematic examination of cavity was performed starting from fundus of the uterus, both ostia and all the four walls of the uterus. Internal os and cervical canal was seen by slowly withdrawing hysteroscope. This was followed by diagnostic laparoscopy. Uterine manipulator was fixed in position by holding cervix transversely with vassellum. Pneumoperitoneum was created using carbon dioxide gas. (inert, safest, readily absorbable, not supporting combustion). The gas flow rate was kept at 1 liter/minute and approx. 1-1.5 liter gas was required for diagnostic laparoscopy to maintain pressure of 12 mm Hg inside the peritoneal cavity. The trocar cannula was pushed in at 45 degrees with screwing movement after lifting the lower abdominal wall. The cannula is removed and laparoscope was introduced. The pelvic organs were first inspected by manipulating uterus; tubes, ovaries and pouch of Douglas were visualized for any pathology. Chromoperturbation was done to check the patency of tubes by injecting

dilute methylene blue dye through the Leech Wilkinsons cannula or foley's catheter. After completion of procedure, laparoscope was removed and trocar sleeve was kept open to remove air from abdominal cavity. The skin was sutured and sterile dressing was done. After completion of procedure the patients was shifted to post-operative ward when they were completely out of anaesthesia.

After the procedure, management was done according to the cause identified; the findings were explained to the patient. They were discharged on the next day. A course of antibiotic for five days was prescribed. Comparison between findings of ultrasonography and hystero-laparoscopy was done and the results were analysed in percentages.

RESULT

The total sample consisted of 50 patients diagnosed with infertility. 74% of total patients had primary infertility and 26% patients had secondary infertility. The age ranged from 21-47 years with maximum no. of cases 34% in the age group of 26 to 30 years among primary infertility and 10% among secondary infertility in the age group of ≥ 40 years. Majority (28% and 12%) of patients had an average married life for <5 yrs in primary infertility and for 11-15 yrs in secondary infertility respectively (Table 1).

In the present study, TVS showed normal study in 62% of patients of in fertility and other patients had some pathology in uterine cavity predominantly endometrial polyp in 2% of patients, fibroid in 8%, PID in 8%, PCOD in 10%, ovarian

Age(yrs)	Primary Infertility(37)		Secondary infertility(13)	
	Number	Percentage(%)	Number	Percentage(%)
21-25	8	16	1	2
26-30	17	34	4	8
31-35	11	22	3	6
>35	1	2	5	10
Marriedfor(years)				
<5	12	24	1	2
5-10	14	28	6	12
11-15	11	22	3	6
>15	2	4	1	2

Table-1: Demographic characteristics

Findings	Primary infertility		Secondary infertility	
	Number	Percentage(%)	Number	Percentage(%)
Normal	25	50	6	12
EnlargedUterus	-	-	-	-
SmallUterus	1	2	-	-
UterineAnomaly	3	6	-	-
Polyp	1	2	-	-
Fibroid	2	4	2	4
PID	2	4	2	4
PCOD	5	10	1	2
OvarianCyst	2	4	1	2
Endometrioticcyst	2	4	1	2
Hydrosalpinx	1	2	-	-

Table-2: TVS findings in patients of infertility

Findings	Primary Infertility		Secondary Infertility	
	Number	Percentage(%)	Number	Percentage(%)
1. Normal	18	36	3	6
2. Atrophicendometrium	2	4	2	4
3. Polyp	6	12	2	4
4. Adhesions	7	14	3	6
5. BlockedOstia	3	6	-	-
6. Septum	3	6	1	2
7. SubmucosalFibroid	2	4	2	4

Table-3: Hysteroscopic findings in patients of infertility

Findings	Primary Infertility		Secondary Infertility	
	Number	Percentages(%)	Number	Percentages(%)
1. Normalstudy	15	30	4	8
2. Tubalblock				
Unilateral	6	12	2	4
Bilateral	3	6	1	2
3. UterineAnomaly	2	4	-	-
4. PCOD	4	8	1	2
5. Endometrioma	4	8	2	4
6. Fibroiduterus	3	6	-	-
7. Tubo-ovarianMass	1	2	2	4
8. OvarianCyst	3	6	1	2
9. PID	2	4	3	5

Table-4: Laproscopic findings in patients of infertility

cyst (including endometriotic) in 8% (Table 2).

Hysteroscopy findings were normal in 24 cases (48%). Abnormal hysteroscopy findings were seen in 26 cases (52%), out of which most of the cases were of uterine synechiae (20%), atrophic endometrium (6%), endometrial polyp (16%), blocked ostia (6%), uterine septum (6%) and submucous fibroid (8%) (Table 3).

Among 50 patients, 19 (38%) cases had absolutely normal laparoscopic findings. Among the various pathologies, tubal pathology contributed the most (24%), followed by, endometrioma (12%), PCOD (10%), uterine (10%) and pelvic (4%) pathologies as given in Table 4. Among uterine factors, in the present study fibroids were observed in 3 patients followed by congenital anomalies in 2 patients. And next among the tubal factors, abnormal occlusion was observed in 13 (26%) cases and remaining were observed with normal findings 37 (74%). Bilateral polycystic ovaries were observed in 5 (10%) cases among ovarian pathologies, 6 (12%) cases had chocolate cyst, 4 (8%) cases had ovarian cyst, and 3 (6%) cases had tubo-ovarian mass. In present study, typical pelvic adhesions were found in among 2(4%) patients and about 2 patients had Koch's abdomen.

DISCUSSION

Infertility is a worldwide problem affecting 10 to 15 percent of reproductive aged couples.⁹ Mean age in our study among primary infertility was 26-30 years and >35 years in secondary infertility. In the similar study by Chaitra K et al., the mean age at presentation was 21-25 years in primary infertility and 26-30 years in secondary infertility. The

difference may be due to rise in mean age at which women present with infertility due to late marriages.¹⁰

These are three methods that can evaluate the uterine cavity differently, the TVS and HSG indirectly and hysteroscopy under direct vision. The accuracy of these methods has been widely studied by several international authors. TVS still remains the best non-invasive and the initial method of assessment of primary infertility. Many specialists feel that among invasive methods, hysteroscopy is a more accurate tool because of the high false-positive and false negative rates of intra uterine abnormality with HSG.¹¹

While comparing the results between hysteroscopy and TVS, later showed abnormal findings correctly in 38% of cases, and 62% cases were undiagnosed. Similar to this was found by Shukla P et al. where 35% of cases showed abnormal findings, and 65% cases were undiagnosed.¹² TVS showed that 7 cases (14%) had intrauterine pathology including fibroids, anomalous uterus (arcuate uterus, septum), polyps and small uterus. Via hysteroscopy 29 patients (58%) were diagnosed. The most frequent findings being adhesions, polyp, submucosal fibroid, atrophic endometrium, blocked ostia and septate uterus. But TVS also diagnosed ovarian and tubal pathology which could not be assessed with hysteroscopy. Similarly Shukla P et al., study diagnosed uterine cavity abnormalities in 66.67% cases of infertility by hysteroscopy and 35% by TVS. Hence, hysteroscopy is better than TVS for the diagnosis of intra-uterine pathology but still TVS remains the best non-invasive method for study of uterine as well as adnexal pathology in infertility. Lawrenz et al. observed that 2D and 3D serial TVS correctly predicted

uterine cavity in nearly 98% of cases demonstrating high sensitivity and specificity of TVS for detecting intracavitary pathology.¹³ This dissimilarity with recent study could be because TVS was conducted only in 2D mode and not performed serially.

Diagnostic laparoscopy is considered as an essential and valuable step of the infertility evaluation. It allows the surgeon to visualize tubal patency and integrity, endometriosis and pelvic adhesions.¹⁴ In this study, normal pelvic findings and patent tubes on laparoscope was found in 30% cases of primary infertility and only 8% cases in secondary infertility. The most commonly found pathologies were tubal blockage (24%) which could not be assessed by TVS. This was followed by endometriosis (12%), PID (10%) polycystic ovarian disease (10%), ovarian cyst (8%), fibroid uterus (6%), tubo-ovarian mass (6%), uterine anomalies (4%). Whereas in TVS we found fibroid in 8%, PID in 8%, PCOD in 10% and ovarian cyst (including endometriotic) in only 8% of cases.

Among ovulatory disorders endometriotic cyst was the commonest finding found on laparoscopy. Endometriosis may lead to female infertility, although it has not been confirmed whether endometriosis can be the sole cause of infertility or it is only contributory factor that leads to it. Nevertheless, most women who are infertile suffer from endometriosis. The frequency of fibroid in the present study was 6% in all cases of infertility, similar results reported by Khaula from Lahore. The incidence of myoma in women with infertility without any obvious cause of infertility is estimated to be 1-2.4%. Chaitra K et al¹⁰ found similar results with tubal disease accounts for 15-20% of cases of primary infertility and approximately 40% of secondary infertility.

A single episode of PID carries up to 10% risk of future tubal factor infertility.¹⁵ In present study, the frequency of pelvic inflammatory disease (PID) was 10%. Tubal occlusion and peritubal or periovarian adhesions are factors responsible for inhibition of ovum pickup and transport. Laparoscopy is thus a definitive way to diagnose them which could not be diagnosed by TVS.

In India, most of patients usually go to alternative medicine and un-trained health practitioners for the treatment of infertility, which leads to further delay in proper management. Laparoscopy not only helps in identification of unsuspected pathology, but also contributes to decision making. It should be considered initially as a part of the infertility evaluation in women, especially those with a history of pelvic inflammatory disease, pelvic surgery, and chronic pelvic pain.¹⁶

CONCLUSION

We believe that Hysteroscopy is the best investigation to diagnose small intrauterine lesions much more precisely compared with TVS. Thus we consider routine hysteroscopy should be included in the evaluation of the infertile couple. Most common causes responsible for infertility on Laparoscopy were tubal occlusion, PCOD and endometriosis. On Hystero-Laparoscopy we can treat them simultaneously. Hence, Hystero-Laparoscopy is better than TVS alone for

the diagnosis of infertility pathology but still TVS remains the best non-invasive method for study of uterine as well as adnexal pathology in infertility.

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