Correlation of laparoscopic finding with ultrasonography and hysterosalpingography findings in females with infertility

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ARTICLE INFO

Article history:
Received 20-09-2021
Accepted 07-10-2021
Available online 26-11-2021

Keywords:
HSG
Infertility
Laparoscopy in infertility

ABSTRACT

Introduction: Infertility is best defined as the inability to conceive after one year of unprotected regular intercourse or many couples, infertility and its treatment cause a serious strain on their interpersonal relationship, and cause disturbed relationships with other people.

Diagnostic laparoscopy is generally not a part of initial infertility evaluation, however, number of reports have shown that it is effective procedure for evaluation of long-term infertility.

Materials and Methods: A total of 207 patients were studied from at GMCH, Gondia, Maharashtra. Total 207 patients had primary/secondary infertility and 5 patients had primary amenorrhea were selected for study. Uterus, ovaries, tubes and cul de sac were inspected and findings noted. Next chromopertubation test was done with 10-15 ml of 1% aqueous methylene blue via the leech-Wilkinson cannula was inserted and findings noted and statistical Analysis was done.

Results: India showed the mean age of infertility was 28.4 years. 81.16% subjects had primary whereas 16.43% had secondary infertility.

In the present study maximum 165 (79.7%) had normal size uterus. Out of which 8 (3.86%) had bicornuate uterus. 6.28% subjects had large size uterus. Out of which 5.80% had fibroid and 0.48% had adenomyosis.

Conclusion: Diagnostic Laparoscopy and hysteroscopy is a better modality for diagnosing uterine, tubal and ovarian causes of infertility compared to hysterosalpingography and ultrasonography. Most of the patients had normal ultrasonographic, hysterosalpingographic and laparoscopic findings. Out of the rest, Structural adhesions were the most common cause of infertility among women in reproductive group.

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1. Introduction

Infertility is defined as the inability to conceive after one year of unprotected regular sexual intercourse.¹ Total infertility is divided into primary and secondary infertility. Primary infertility is defined as the inability to conceive after one year among women 15 to 49 years old with contact with sexually active partners and no contraceptive use. Secondary infertility refers to the inability to conceive following a previous pregnancy.¹,²

Fertility varies across various regions of the world and is estimated to affect 8 to 12 percent of couples worldwide.² For many couples, infertility and its treatment cause a serious strain on their interpersonal relationship, and cause disturbed relationships with other people.³ The most common factors responsible for infertility in females
are anovulatory disorder, tubal factors, uterine and cervical factors along with endometriosis. One third of the infertility cases are due to anatomical abnormalities of the female reproductive tract such as tubal blockage.\textsuperscript{4,5}

An accurate diagnosis is the best key to the treatment. The workup of the female partner begins with history and examination. It is more important to perform the relevant investigation in a logical order at the correct time as compared to the routine simple so least invasive and most predictive investigations should be performed first. A number of diagnostic tests are being used in clinical practice to assess tubal patency as part of the work-up for sub-fertility.\textsuperscript{6}

Conventional way to assess the uterine cavity, tubal structure and tubal patency was Hysterosalpingography but now it has been largely superseded by laparoscopy and hysteroscopy. Laparoscopy is considered the clinical reference test for diagnosing tubal pathology.\textsuperscript{7} Laparoscopy allows visualization of peri-adnexal adhesions and the presence of endometriosis, which cannot be done with HSG.\textsuperscript{8} It provides information regarding tubal and ovarian status, uterine normality and standard means of diagnosing various pelvic pathology e.g. pelvic inflammatory disease, endometriosis, pelvic congestion and tuberculosis. Untreated pelvic inflammatory disease, post-abortal, postpartum infection and tuberculosis are common factors of infertility in developing countries.\textsuperscript{8}

Diagnostic laparoscopy is generally not a part of initial infertility evaluation, however, number of reports haves hown that it is effective procedure for evaluation of long-term infertility.

2. Materials and Methods

A total of 207 patients were studied from September 2017 to June 2019 at Government Medical College and Hospital, Gondia, Maharashtra. Out of 207 patients, 202 patients had primary/secondary infertility and 5 patients had primary amenorrhea were selected for study.

Study subjects were screened and evaluated clinically with detailed history. All the investigations of female partner were carried out. Before doing laparoscopy, patients were informed of the diagnostic nature of the test and the potential risks involved and consent obtained. Laparoscopy was done during pre-menstrual phase of the cycle. Patients were admitted a day before laparoscopy and after thorough examination. It is more important to perform the relevant investigation in a logical order at the correct time as compared to the routine simple so least invasive and most predictive investigations should be performed first. A number of diagnostic tests are being used in clinical practice to assess tubal patency as part of the work-up for sub-fertility.\textsuperscript{6}

In this study total 207 patients were studied. Mean age of the study group was 26.71 years (range 19-39 years). Maximum patients (41.54\%) were in age group 26-30 years. 81.16\% patients had primary infertility, 16.43\% patients had secondary infertility and 2.41\% had primary amenorrhea. Maximum patients had 3 to 5 years of infertility (mean 5.21 years for primary infertility, 4.57 years for secondary infertility) at presentation. The incidence of study subjects having one abortion is 2.47\%, 2 abortions is 6.43\% and those having 3 or more abortions is 0.99\%.

Table 1: Gynaecological examination of patient

| Findings                  | No. of subjects | Percent (%) |
|---------------------------|-----------------|-------------|
| Uterus                    |                 |             |
| No. uterus felt           | 4               | 1.93        |
| Small sized uterus        | 23              | 11.21       |
| Normal sized uterus       | 172             | 83.09       |
| Enlarged uterus           | 08              | 03.87       |
| Total                     | 207             | 100         |
| Adnexa                    |                 |             |
| Adnexa not palpable       | 112             | 54.10       |
| Adnexa palpable           | 95              | 45.90       |
| Total                     | 207             | 100         |

In 1.93\% subjects uterus was not felt, 11.21\% had small sized uterus, 83.09\% had normal sized uterus and 3.87\% had enlarged uterus. In 45.90\% adnexa was palpable on gynaecological examination.

In the present study, the incidence of normal sized uterus on USG is 49.29\%, small sized uterus is 10.62\% and enlarged uterus is 3.86\%.

The incidence of normal sized uterus in laparoscopy is 79.70\% and of small sized uterus is 12.07\% and enlarged uterus is 6.27\%.

In this study the incidence of normal sized ovaries on laparoscopy is 47.33\%, streak ovaries is 1.94\%. The incidence of polycystic ovaries is 4.34\% and of ovarian cyst is 2.9\%. In 2 (0.97\%) subjects both ovaries were not visualized and in 2 (0.97\%) only one ovary was visualized.

According to the findings of present study 35 (16.90\%) subjects had hydrosalpinx while 24 (11.59\%) subjects had beaded tubes and 10 (4.83\%) subjects had tubercles over pelvic organs, i.e. uterus, tubes and ovaries.
Table 2: Distribution of study subjects as per Ultrasonography findings

| Ultrasonography Findings                          | No. of subjects | Percent (%) |
|--------------------------------------------------|-----------------|-------------|
| Small sized uterus with small sized ovaries       | 11              | 5.31        |
| Small sized uterus with normal sized ovaries      | 07              | 3.38        |
| Small sized uterus with bigger sized ovaries      | 04              | 1.93        |
| Normal sized uterus with small sized ovaries      | 38              | 18.36       |
| Normal sized uterus with normal sized ovaries     | 102             | 49.29       |
| Normal sized uterus with bigger sized ovaries     | 37              | 17.87       |
| Enlarged uterus with normal sized ovaries         | 07              | 3.38        |
| Enlarged uterus with bigger sized ovaries         | 01              | 0.48        |
| Total                                            | 207             | 100         |

Table 3: Distribution of patients according to laparoscopic findings of uterus

| Uterus                                      | No. of subjects | Percent (%) |
|---------------------------------------------|-----------------|-------------|
| Small sized uterus                          | 25              | 12.07       |
| Normal sized uterus                         | 165             | 79.70       |
| Large sized uterus                          | 13              | 06.27       |
| Mayer – Rokitansky – Hauser syndrome        | 04              | 1.93        |
| Total                                       | 207             | 100         |

Table 4: Distribution of patients according to ovarian findings on laparoscopy

| Finding of ovary                         | No. of subjects | Percent (%) |
|-----------------------------------------|-----------------|-------------|
| Streak with e/o ovulation               | 2               | 0.97        |
| Streak without e/o ovulation            | 2               | 0.97        |
| Normal size with e/o ovulation          | 98              | 47.33       |
| Normal size without e/o ovulation       | 86              | 41.55       |
| Polycystic ovary with e/o ovulation     | 1               | 0.48        |
| Polycystic ovary without e/o ovulation  | 8               | 3.86        |
| Ovarian cyst                             | 6               | 2.9         |
| Only one ovary visualized                | 2               | 0.97        |
| Both not visualized                      | 2               | 0.97        |
| Total                                    | 207             | 100         |

Table 5: Distribution of patients according to fallopian tube abnormalities on laparoscopy

| Findings of fallopian tube               | No. of subjects | Percent (%) |
|------------------------------------------|-----------------|-------------|
| Normal                                    | 148             | 71.49       |
| Small hydrosalpinx                       | 26              | 12.56       |
| Huge hydrosalpinx                        | 9               | 4.34        |
| Beaded tubes                              | 24              | 11.59       |
| Total                                     | 59              | 28.49       |

Table 6: Hysterosalpingography (HSG) findings

| Findings of HSG                          | No. of subjects | Percent (%) |
|------------------------------------------|-----------------|-------------|
| Tubes patent                             | 66              | 52.38       |
| Tubes blocked                            | 37              | 29.36       |
| Unilateral hydrosalpinx                  | 10              | 07.94       |
| Bilateral hydrosalpinx                   | 05              | 03.97       |
| Beaded tubes                             | 03              | 02.38       |
| Tubes blocked with unilateral hydrosalpinx | 02        | 01.59       |
| Tubes blocked with bilateral hydrosalpinx | 02        | 01.59       |
| Tubes with beaded appearance             | 01              | 00.79       |
| Total                                     | 126             | 100         |

In the present study HSG was done in 62.38% subjects, out of them 52.38% showed patent tubes, while 29.36% showed blocked tubes.

Table 7: Distribution of patients according to chromopertubation findings

| Results                      | No. of subjects | Percent (%) |
|------------------------------|-----------------|-------------|
| Patent tube                  | 153             | 75.75       |
| Blocked tube                 |                 |             |
| Cornual block                | 4               | 23.26       |
| Isthumal block               | 9               | 14          |
| Fimbrial block               | 4               | 11          |
| Total                        | 17              | 30          |
| Not possible                 | 2               | 0.99        |
| Total                        | 202             | 100         |

In present study, 29 (14%) had tubal adhesions while 6(2.9%) had ovarian adhesions and 27(13.04%) subjects had both tubal and ovarian adhesions. In 18 (8.7%) subjects there was mild endometriosis and in 7 (3.38%) subjects there was moderate to severe endometriosis. 77 subjects had...
free fluid in pouch of Douglas / abdomen.

Table 8: Distribution of patients according to various pathologies on laparoscopy

| Pathology            | No. of subjects | Percent (%) |
|----------------------|-----------------|-------------|
| Structural adhesions |                 |             |
| Tubal                | 29              | 14          |
| Ovarian              | 6               | 2.90        |
| Both tubal and ovarian | 27          | 13.04       |
| Total                | 62              | 29.94       |
| Endometriosis        |                 |             |
| Mild                 | 18              | 8.70        |
| Moderate to severe   | 7               | 3.38        |
| Total                | 25              | 12.08       |

In the present study, 10.62% subjects had small size uterus, while laparoscopy demonstrated small size uterus in 12.07% subjects, (‘p’ > 0.05 – not significant). 85.50% subjects had normal size uterus while laparoscopy revealed it in only 79.70% subjects (‘p’ < 0.05 – significant). 3.86% had enlarged uterus while laparoscopy revealed it in 06.27% subjects (‘p’ > 0.05 – not significant).

Similarly, 3.86% cases had small or non-visualized ovaries on laparoscopy whereas 23.67% cases had sonographically demonstrated small ovaries (‘p’ < 0.05 – significant). 88.89% cases had normal ovaries on laparoscopy whereas 56.04% had normal ovaries on USG (‘p’ < 0.05 – significant). 7.25% cases had enlarged ovaries due to single or multiple cyst whereas 20.29% cases had enlarged ovaries demonstrated on USG (‘p’ < 0.05 – significant).

In the present study, the incidence of patent tubes on laparoscopy is 75.1% and that of blocked tubes is 23%. In 30 subjects (14.49%), both the tubes were blocked, out of which 14 had Isthmus block, 11 had Fimbrial block, and 5 had Cornual block. In 17 subjects (8.21%), there was unilateral block out of which 9 had Isthmus block, 4 had Fimbrial block and 4 had Cornual block. In 2 subjects, chromopertubation was not possible due to one subject with vaginal atresia and one had pelvic adhesions.

The incidence of patent tubes on hysterosalpingography is 52.3% and the incidence of patent tubes on laparoscopy is 75.75%, (‘p’ < 0.05 – significant). The incidence of blocked tubes on laparoscopy is 23.26% and incidence of blocked tubes on hysterosalpingography is 29.36%, (‘p’ > 0.05 – not significant). Incidence of hydrosalpinx on laparoscopy was 16.91% and on HSG was 15.08%, (‘p’ < 0.05 – significant). In the present study the incidence of beaded tubes on laparoscopy was 11.59% and on HSG was 3.17%, (‘p’ < 0.05 – significant).

4. Discussion

Out of total 207 patients studied. Mean age of the population studied was 26.71 years. Parveen S et al. showed the mean age of infertility was 28.4 years. Similarly, a study by Adamson P from Mysore, India showed the mean age of infertility was 28.4 years.

81.16% subjects had primary infertility whereas 16.43% had secondary infertility. Shetty SK showed that there were 68% cases of primary infertility and 32% cases of secondary infertility.

Duration of primary infertility was between 1-13 years with a mean of 5.21 years and secondary infertility was between 2-12 years with a mean of 4.57 years. Study by Babar M et al. showed that the maximum number (45.7%) of patient presented after 2-5 years of failure to conceive and 54.3% of patients had duration of infertility of more than 5 years.

In the present study maximum 165 (79.7%) had normal size uterus. Out of which 8 (3.86%) had bicornuate uterus. Similarly, Thankam R, et al. (1978), quoted bicornuate uterus in 2.63% of patients. In the present study, 6.28% subjects had large size uterus. Out of which 5.80% had fibroid and 0.48% had adenomyosis. Similar results reported by Khaula et al. from Lahore. The incidence of myoma in women with infertility without any obvious cause of infertility is estimated to be 1-2.4%. 1.96% subjects had Meyer – Rokitansky – Kuster - Hauser syndrome.

In the present study, 16.90% had hydrosalpinx however Gupta et al. (1984), quoted 6.4%. This may be due to high prevalence of tuberculosis in our region. 11.59% subjects had beaded tube. In the present study, 4.80% subject had tubercles over pelvic organs.

Diagnostic Laparoscopy was significantly beneficial in detection of normal uterine pathologies and all ovarian pathologies but not significantly beneficial in detection in small and large uterine pathologies.

Incidence of patent tubes on Laparoscopy with chromoperturbation is significantly better than HSG in diagnosing patency and pathologies of fallopian tubes. Sarogi et al. (1981), quoted bilateral blockage in 17.5% and unilateral in 9.16% of patients. Hutchins (1977), reported 10.3% of bilateral and 10.1% of unilateral tubal block.

In present study, 14% subjects had tubal adhesions while 3% had ovarian adhesions and 13.04% subjects had both tubal and ovarian adhesions. Similarly Mahmoud F, et al (1978), quoted pelvic adhesions in 30.35%. In 9% subjects, there was mild endometriosis and in 3.38% subjects, there was moderate to severe endometriosis. 77 subjects had free fluid in pouch of Douglas / abdomen. Thankam R et al (1978) reported in 12.03%.

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 clinical signs and symptoms that make on of endometriosis (dysmenorrhea,
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Cite this article: Arora GB, Bodade R, Dhurve A, Vaishnao LS, Bagga G. Correlation of laparoscopic finding with ultrasonography and hysterosalpingography findings in females with infertility. Indian J Obstet Gynecol Res 2021;8(4):437-442.