Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Original Research Article

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

Garima Bagga Arora[1,*], Ritesh Bodade[2], Asmita Dhurve[2], Lohit S Vaishnao[3], Gourav Bagga[4]

[1]*Dept. of Obstetrics and Gynaecology, Government Medical College, Gonda, Uttar Pradesh, India*
[2]*Dept. of Surgery, Government Medical College, Gonda, Uttar Pradesh, India*
[3]*Government Medical College, Gonda, Uttar Pradesh, India*
[4]*Dept. of Radiology, Government Medical College, Gonda, Uttar Pradesh, India*

ARTICLE INFO

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

Keywords:
HSG
Infertility
Laproscopy 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 initialinfertility evaluation, however, number of reports haveshown 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 28.4years. 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.

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

* *Corresponding author*.
E-mail address: dreamgarima24@gmail.com (G. B. Arora).

https://doi.org/10.18231/j.ijogr.2021.092

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.[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.[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.[7] Laparoscopy allows visualization of peri-adnexal adhesions and the presence of endometriosis, which cannot be done with HSG.[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.[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 evaluation, preparation and fitness patient were posted for diagnostic laparoscopy.

Standard basic laparoscopic principles were followed during the procedure. Patient in lithotomy position. Per-vaginal and per-speculum examination done and anterior lip of cervix was caught with vulsellum and manipulator was inserted in cervical canal.Umbilicus was used for camera port and assistant manipulates the uterus per-vaginally with manipulator. 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.

The patient was discharged next day after counseling about the further plan of treatment depending upon the whole investigative workup. Data was collected and grouped. Standard statistical software (SPSS v17) was used for analysis of data.

3. Results

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

Per vaginal/ per-rectal 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 – Kuster - 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
		Unilateral	Blateral	
Blocked tube	Cornual block	4	5	23.26
	Isthumal block	9	14	
	Fimbrial block	4	11	
	Total	17	30	
Not possible		2		0.99
Total		202		100

Total 202 patients (97.58%), underwent laparoscopic chromopertubation, In 2 (0.99%) subjects chromopertubation was not possible due to one subject with vaginal atresia and one had pelvic adhesions.

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 laparoscopic 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.% and that of blocked tubes is 23%. In 30 subjects (14.49%), both the tubes were blocked, out of which 14 had Isthumal block,11 had Fimbrial block, and 5 had Cornual block. In 17 subjects (8.21%), there was unilateral block out of which 9 had Isthumal block, 4 had Fimbrialblock 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% andthe 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.[9] showed the mean age of infertility was 28.4 years. Similarly, a study by Adamson P[10] from Mysore, India showed the mean age of infertility was 28.4years.

81.16% subjects had primary infertility whereas 16.43% had secondary infertility. Shetty SK[11] 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.[12] 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),[13] 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.[14] 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),[15] quoted in 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 onLaparoscopy with chromopertubation is significantly better than HSG in diagnosing patency and pathologies of fallopian tubes. Sarogi et al (1981),[16] quoted bilateral blockage in 17.5% and unilateral in 9.16% of patients. Hutchins (1977),[17] 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),[18] 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)[13] 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,

Table 9: Correlation of laparoscopy and ultrasonography findings

Organ		Laparoscopy findings (%)	Ultrasonography findings (%)	Mean	'p' < 0.05 – significant
Uterus	Small sized uterus	12.07	10.63	.014	.083
	Normal sized uterus	79.70	85.51	-.058	< 0.001
	Large sized uterus	06.27	3.86	.024	.025
Ovary	Small Ovaries	3.86	23.67	-.198	< 0.001
	Normal Ovaries	88.89	56.04	.329	< 0.001
	Enlarged ovaries	7.25	20.29	-.130	< 0.001

Table 10: Correlation of Laparoscopy and Hysteroscopy findings

Fallopian Tubes	Laparoscopic findings (%) + chromopertubation	Hysterosalpingography findings (%)	'p' < 0.05 – significant	Mean
Patent tubes	75.75 (n=202)	52.38 (n=126)	< 0.001	0.431
Blocked Tubes	23.26 (n=202)	29.36 (n=126)	0..014	0.030
Hydrosalpinx	16.91 (n=207)	15.08 (n=126)	< 0.001	0.097
Beaded tubes	11.59 (n=207)	3.17 (n=126)	< 0.001	0.097

dyspareunia, abnormal uterine bleeding, chronic pelvic pain and/or pelvic mass, utero-sacral ligament nodularity) are not reliable enough to justify diagnosis and treatment. Current thinking dictates visual and/or microscopic confirmation through laparoscope before diagnosing or treating a patient for endometriosis.

5. Conclusion

According to the findings of the present study, Laparoscopic diagnosis 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. In most of the patients, structural adhesions were the most common cause of infertility among women in reproductive group.

6. Source of Funding

None.

7. Conflict of Interest

The authors declare no conflict of interest.

References

1. Inhorn MC. Global infertility and the globalization of new reproductive technologies: illustrations from Egypt. *Soc Sci Med*. 2003;56(9):1837–51.
2. Bushnik T, Cook JL, Yuzpe AA, Tough S, Collins J. Estimating the prevalence of infertility in Canada. *Hum Reprod*. 2012;27(3):738–46.
3. Omoaregba JO, James BO, Lawani AO, Morakinyo O, Olotu OS. Psychosocial characteristics of female infertility in a tertiary health institution in Nigeria. *Ann Afr Med*. 2011;10(1):19–24. doi:10.4103/1596-3519.76567.
4. Adamson PC, Krupp K, Freeman AH, Klausner JD, Reingold AL, Madhivanan P. Prevalence & correlates of primary infertility among young women in Mysore. *India Indian J Med Res*. 2011;134:440–6.
5. Sami N, Ali TS, Wasim S, Saleem S. Risk factors for secondary infertility among women in Karachi, Pakistan. *PLoS One*. 2012;7(4):e35828. doi:10.1371/journal.pone.0035828.
6. Tsuji I, Ami K, Fujinami N, Hoshiai H. The significance of laparoscopy in determining the optimal management plan for infertile patients with suspected tubal pathology revealed by hysterosalpingography. *Tohoku J Exp Med*. 2012;227(2):105–8.
7. Robabeh M, Roozbeh T. Comparison of hysterosalpingography and laparoscopy in infertile Iranian women with tubal factor. *Ginekol Pol*. 2012;83(11):841–3.
8. Sakar MN, Gul T, Atay AE, Celik Y. Comparison of hysterosalpingography and laparoscopy in the evaluation of infertile women. *Saudi Med J*. 2008;29(9):1315–8.
9. Parveen MS, Khanam. Role of Combined Diagnostic Laparoscopy And Simultaneous Diagnostic Hysteroscopy For Evaluation Of Female Subfertility Factors. *Journal Of Surgery Pakistan (International)*. 2010;15(1).
10. Adamson PC, Krupp K, Freeman AH, Klausner JD, Reingold AL, Madhivanan P. Prevalence & correlates of primary infertility among young women in Mysore, India. *Indian J Med Res*. 2011;134(4):440–6.
11. Shetty SK, Shetty H, Rai S. Laparoscopic evaluation of tubal factor in cases of infertility. *Int J Reprod Contracept Obstet Gynecol*. 2013;2(3):410–3.
12. Babar M, Al E. 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.
13. Verma TR, Murphy H. Diagnostic value of laparoscopy in gynaecology; 1978. Available from: https://jogi.co.in/articles/files/filebase/Archives/1978/feb/1978_128_135_Feb.pdf.
14. Khaula K. Role of diagnostic laparoscopy in evaluation of female subfertility. *Serv Inst Med Sci*. 2005;3:31–4.
15. Gupta S, Gupta P, Taly A, Das R. Comparative study: Hysterosalpingography and laparoscopy in 120 cases of infertility. *J Obstet Gynaec India*. 1984;34:685.
16. Sarogi RM, Ambiye VR, Rawal MY. Comparision of Hysterosalpingography and Laparoscopy in the evaluation of tubal function in infertility. *J Obstet Gynaec*. 1981;31:630.
17. Hutchins C. Laparoscopy and hysterosalpingography in the assessment of tubal patency. *Obstet Gynaec*. 1977;49:325.
18. El-Minawi MF, Abdel-Hadi M, Ibrahim AA, Wahby O. Comparative evaluation of laparoscopy and hysterosalpingography in infertile patients. *Obstet Gynecol*. 1978;51(1):29–32.

Author biography

Garima Bagga Arora, Associate Professor

Ritesh Bodade, Associate Professor

Asmita Dhurve, Associate Professor

Lohit S Vaishnao, Medical Intern

Gourav Bagga, Associate Professor

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.