International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Rani LJ et al. Int J Reprod Contracept Obstet Gynecol. 2024 Jun;13(6):1482-1487
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20241430

Original Research Article

Evaluation of causes of female infertility by hysteron-laparoscopy

L. Jhansi Rani*, Akankhya Panda, C. Haripriya

Department of Obstetrics and Gynaecology, NRIIMS, Visakhapatnam, Andhra Pradesh, India

Received: 24 March 2024
Revised: 07 May 2024
Accepted: 18 May 2024

***Correspondence:**
Dr. L. Jhansi Rani,
E-mail: jhansirani.lankamalla9@gmail.com

ABSTRACT

Background: Infertility is rising in recent times affecting about 60-80 million couples worldwide. Female infertility can occur due to variety of causes, ranging from hormonal imbalance to congenital anomalies or infections or other pathologies involving uterus, fallopian tubes, ovaries, external genitalia or even error of coitus. Hystero laparoscopy with chromo perturbation is the gold standard diagnostic method in evaluation of tubal factors, uterine and peritoneal disorders. Aims and objectives were to evaluate the different causes of primary and secondary infertility in women of reproductive age using hysteron laparoscopy with chromo perturbation.
Methods: It is a prospective observational study done on 50 infertile women. Study population is divided into two groups- primary infertility and secondary infertility. Only those infertile ladies whose husbands showed normal semen analysis are included in the study. A detailed clinical history, marital, obstetric history, coital history, addiction history of the patients is taken. Thorough gynaecological examination is done and all necessary investigations is done. All infertile women and women willing to participate are included in the study. Women with male factor infertility and active genital infections are excluded.
Results: Out of 50 infertile women, 36 have primary infertility and 14 have secondary infertility. Of them 24 (48%) have normal findings. Ten (20%) women have unilateral tubal blockage, 4 (8%) women had bilateral tubal blockage, 8 (16%) women have adhesions between ovaries, tubes, uterus and surrounding structures and 4 (8%) women have polycystic ovaries.
Conclusions: Hystero laparoscopy proved to be an important tool in diagnosing the different causes of female infertility.

Keywords: Infertility, Laparoscopy, Blockage, Patency, Adhesions

INTRODUCTION

Infertility is defined as inability to conceive after 1 year of regular unprotected sexual intercourse.[1] About 85-90% of healthy young couples conceive within 1 year, mostly in 6 months. So, approximately 10-15% of couples are affected with infertility. It mostly affects higher socioeconomic status population due to delayed marriage, unhealthy and sedentary lifestyle. Infertility affects the interpersonal relationship between partners and is a cause of depression. The evaluation and treatment are costly and out of reach for many people especially those of low socioeconomic status.

Contrary to what people think, incidence of infertility has not increased over past few decades, but the evaluation and treatment has changed a lot. Hystero-laparoscopy is one such modality used for evaluation of female causes of infertility.

Female infertility can occur due to variety of causes, ranging from hormonal imbalance to congenital anomalies or infections or other pathologies involving uterus, fallopian tubes, ovaries, external genitalia or even error of coitus. The anatomical abnormalities affecting uterus can be congenital abnormalities, leiomyomas, adhesions, or endometrial polyps. They can affect fertility and also cause recurrent pregnancy losses.

Infertility is divided into primary and secondary infertility. Primary infertility is in whom no previous pregnancies have occurred, and secondary infertility is in those who had a prior pregnancy.[2] It need not necessarily be a live birth. Globally, primary infertility is most common among infertile couples. Among the different causes of infertility, the female factors contribute for about 40-50%, male factors contribute for about 30-40%, both partners 10%, and unexplained 10%.

Ovarian causes are the most common cause of female infertility. Some conditions which cause possible tubal damage are pelvic inflammatory disease, endometriosis, tuberculosis, septic abortion, ruptured appendix, tubal surgery or ectopic pregnancy. They affect fertility by preventing union of sperms and ovum. Proximal tubal obstruction affects fertility by preventing sperm from reaching distal fallopian tube where fertilization occurs. Distal tubal block prevents ovum capture from adjacent ovary.

Hysteroscopy and laparoscopy are two classical methods to evaluate tubal patency. They are complementary to each other than mutually exclusive. Hysteroscopy helps visualize uterine cavity and shows internal architecture of the lumen of the tubes. Laparoscopy provides a panoramic view of pelvic anatomy including adhesions, endometriosis and ovarian pathology. Diagnostic hystero-laparoscopy is performed under general anaesthesia or spinal or only deep sedation. It includes complete examination of uterus, anterior and posterior cul-de-sacs, ovarian surfaces and fallopian tubes. When combined with chromopertubation, it helps to identify tubal causes of infertility. Prognosis is best when both the tubes are patent, poor when both the tubes are blocked and intermediate when one tube is blocked. The laparoscope can be moved around the pelvic base for a thorough inspection of the peritoneal surface, making it an effective way to obtain an early diagnosis in patients with suspected genital tuberculosis.[2] Diagnostic laparoscopy has been found to be safe and cost-effective in the initial management of young women with suspected genital tuberculosis. Laparoscopy can find endometriosis, pelvic and adnexal adhesions, and milder forms of distal tubal occlusive disease, all of which may have a detrimental effect on fertility. When doing a diagnostic laparoscopy, the physician also has the chance to perform a therapeutic operation.

Hystero laparoscopy is gold standard diagnostic method in evaluation of tubal factors, uterine and peritoneal disorders. All pelvic organs can be visualized directly by this method. It is the single procedure which gives maximum information in evaluation of female infertility.[8]

Aim and objectives

Aim and objectives were to study the different causes of primary and secondary infertility in women of reproductive age using hysterolaparoscopy with chromo perturbation in a tertiary care teaching hospital. It is a prospective observational study done among 50 women undergoing workup for infertility in NRI institute of medical sciences, Visakhapatnam from December, 22 to November, 23. We conducted the study to evaluate what are the causes of infertility which will help in better management of patients.

METHODS

This is a prospective observational study done in department of obstetrics and gynaecology, NRI institute of medical sciences, Visakhapatnam, Andhra Pradesh, India from December 2022 to November 23. Analysis was done using SPSS 25th version.

Study included 50 cases of both primary and secondary infertility in women. Women were divided into two groups-group I-primary infertility and group II-secondary infertility. Only those infertile ladies whose husbands showed normal semen analysis are included in the study. Women with male factor infertility and active genital infections are excluded. A detailed clinical history, marital, obstetric history, coital history, addiction history of the patients is taken. Thorough gynaecological examination is done and all the necessary investigations (Thyroid profile, FSH, LH, prolactin, RBS, CBC, CUE, HIV, HBSAG, HCV, RFT, chest X-ray, ECG, ultrasonography) are done. Women with no identifiable causes are counselled regarding the procedure. Written and informed consent is taken. They are kept on fasting for 6-8 hrs.

Under spinal anaesthesia, hystero laparoscopy with chromo pertubation is done. The laparoscope, pneumoperitoneum device, Verres needle, and trocar and sleeve are necessary laparoscopic instruments. The creation of pneumoperitoneum is the first stage in a laparoscopy. A small supraumbilical incision is used to insert the Verres needle, and gas is insufflated at a rate of one liter per minute with a maximum gas pressure of 14 mm Hg. The required amount of gas ranges from 1-4 liters. The needle is removed while the patient is slightly leaned toward the Trendelenburg position. The trocar and sleeve are securely grasped in the right hand and angled 45 degrees toward the uterus. A laparoscope is inserted through the sleeve once the trocar has been removed. In order to maintain the pneumoperitoneum, the gas insufflator is now connected to the automated flow render low pressure. The telescope is connected to the light source by a fiber optic cable, and observation can then begin. It reduces abdominal contents and provides a wide-angle view of the pelvis. At the vaginal end, a helper uses a sound or dilator to manipulate the uterus. The viewing may or may not continue depending on the indication. Leech Wilkinson's canula is inserted and methylene blue or indigo carmine solution is injected for chromo-tubation. Leakage of dye from tubes indicate that the tubes are patent. Minor blocks in tubes are also removed in this procedure and it helps differentiate spasmodic contracture of tubes from actual tubal blockage.

RESULTS

Fifty cases of infertility were taken into consideration. Out of these 34 cases (68%) were of primary infertility and 16 cases (32%) were of secondary infertility (Table 1). In primary infertility group, out of 34 cases, maximum number of cases;19 (55.88%) was in the age group 20-25 years followed by age group 26-30 years i.e., 8 cases (23.5%). Minimum number of cases was in age group 36 and >36 years. In secondary infertility group, cases varied in the age of 26-40 years. Maximum number of cases were in the ago group of 26-30 years i.e. 9 cases (56.25%) and minimum number of cases were in the age group of 36 years and above i.e. 2 cases (12.5%) and rest of the cases are in between 31-35 years of age as depicted in Table 2.

Table 1: Distribution of women into primary and secondary infertility.

Infertility	No. of women	Percentage (%)
Primary	34	68
Secondary	16	32

Table 2: Distribution of women based on age groups.

Age groups (In years)	Primary infertility	Percentage (%)	Secondary infertility	Percentage (%)
21-25	19	38	2	4
26-30	8	16	9	18
31-35	5	10	3	6
>36	2	4	2	4

Table 3: Distribution of women based on years of marital life.

Years of marital life	Primary infertility	Percentage (%)	Secondary infertility	Percentage (%)
<5	20	58.82	6	37.5
5-10	12	35.29	8	50
>10	2	5.88	2	12.5

Out of 34 patients with primary infertility, 20 (58.82%) had <5 years of marital life, 12 (35.29%) had 5-10 years of marital life and 2 (5.88%) had >2 years of marital life with regular timely intercourse. Out of 16 patients with secondary infertility, 6 (37.5%) had <5 years of marital life, 8 (50%) had 5-10 years of marital life and 2 (12.5%) had >10 years of marital life as depicted in Table 3.

On diagnostic laparoscopy with chromopertubation, out of 50 cases of infertility normal tubes with bilateral spill were present in 19 cases (55.88%) of primary infertility and 5 cases (31.25%) of secondary infertility. According to Table 4, out of 50 cases of infertility, 46 patients (92%) had normal ovaries. 4 patients (8%) had PCOS. Of them 2 patients were of primary infertility and 2 patients of secondary infertility. Bilateral tubal blockage was present in 3 patients (8.82%) of primary infertility and 1 patient (6.25%) of secondary infertility. Unilateral tubal block was notes in 10 patients. Of them. 5 patients (14.7%) of primary infertility and 2 patients (12.5%) of secondary infertility had left tubal blockage and 2 patients (5.88%) of primary infertility and 1 patient (6.25%) of secondary infertility had right tubal blockage. Adhesions were found in 3 patients (8.88%) of primary infertility and 5 patients (31.25%) of secondary infertility.

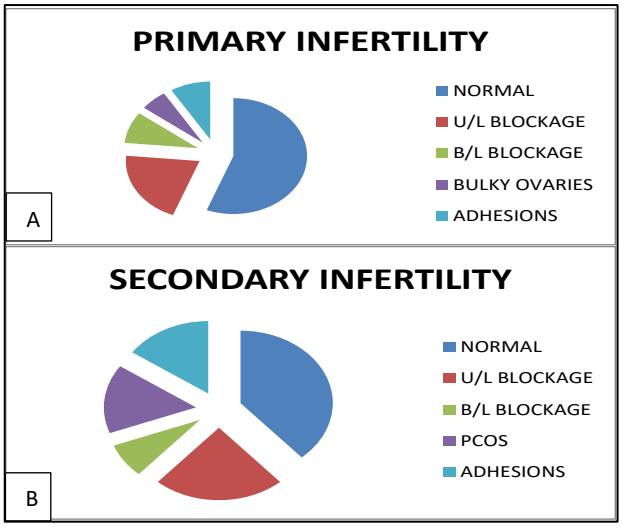

Figure 1 (A and B): Distribution of women of primary infertility based on hysteron-laparoscopy findings, and distribution of women of secondary infertility based on hysteron-laparoscopy findings.

Peri tubal/ per ovarian adhesions with both tube patents were present in 1 cases of primary infertility and 3 cases of secondary infertility. In 1 cases of primary infertility and one case of secondary infertility, only one tube was

patent. Massive adhesions were present in 1 case of secondary infertility.

Table 4: Distribution on women based on hysterolaparoscopic findings.

Hystero-laparoscopy findings	Primary infertility		Secondary infertility	
	N	%	N	%
Normal	19	55.88	5	31.25
Unilateral tubal block	7	20.58	3	18.75
Bilateral tubal block	3	8.82	1	6.25
Bulky ovaries	2	5.88	2	12.5
Adhesions	3	8.88	5	31.25

Table 5: Distribution based on tubal patency among patients having adhesions.

Variables	Primary infertility	Secondary infertility
Bilateral tubes patency	1	3
Unilateral tube patent	1	1
Bilateral tubal blockage	1	1

DISCUSSION

Diagnostic laparoscopy is an essential part in the complete evaluation of infertile couple. Direct visualization of abdominal and pelvic organs allows definitive diagnosis to be made in cases where clinical evaluation and imaging techniques have failed. In the present study, laparoscopy was done to study its utility in the evaluation of female infertility, and comparative frequencies of different etiologies in primary and secondary infertility were analysed. World widely, infertility affects 8-12% couples during their reproductive lives. Prevalence of primary infertility in India is between 3.9 to 16.8%. The essential principles of good treatment are based on correct diagnosis.

The 50 cases of infertility were taken into consideration. Out of these 34 cases (68%) were of primary infertility and 16 cases (32%) were of secondary infertility. Pie chart depicts the distribution of cases according to the age groups. Our findings are in correspondence with those of Panchal et al who found the incidence of primary and secondary infertility to be 68% and 32% respectively.[9] Similar findings were observed by various authors like Gupta et al.[10] This indicates that incidence of primary infertility is higher. In primary infertility group, out of 34 cases, maximum number of cases (38%) was in the age group 21-25 years followed by age group 26-30 years. The minimum number of cases was in the age group 36 and >36 years.

In the secondary infertility group, the cases varied in the age of 26-38 years. Maximum number of cases were in the ago group of 26-30 years i.e. 9 cases (59.1%), and minimum number of cases were in the age group of 36 years and above and 20-25years and rest of the cases are in between 31-35 years of age. Results of our study are in accordance with study done by Panchal et al where maximum infertility cases were in age group 21-25 years followed by 26-30 years age groups.[9] Study done by Singh et al also showed similar results.[11] Age incidence in primary infertility was more because the patients came 5-6 years after their marriage as they were either ignorant about their problem or were hesitant to disclose it.

On diagnostic laparoscopy, out of 50 cases of infertility, adhesions were found in 3 patients of primary infertility (8.88%) and 5 patients of secondary infertility (31.25%). One patient was having primary infertility with endometrioma or complex ovarian cyst in ultrasound. On DHL dense omental adhesions were present between anterior abdominal wall, pelvic structures and bowel. Bilateral adnexa was not visualised and uterus was adherent to cyst posteriorly. Bilateral tubal patency couldn't be made out. Frozen pelvis was noted. 5 patients had flimsy adhesions with bilateral tubes patent. Adhesiolysis was done. 1 patient had adhesions with bilateral tubes adherent to uterus. Adhesiolysis was done and bilateral tubes were patent. 1 patient had left fallopian tube fibroidectomy done and left side tubal blockage was noted. In Duigan et al bilateral block with adhesions were present in 7.9% cases of primary sterility and 16.1% cases of secondary sterility which is contrasting to our study.[12] In our study the incidence of bilateral block is 8.82% in primary infertility and 6.25% in secondary infertility. Fear et al found 5 patients with peri tubal adhesions (18.52%).[13] Musich et al did laparoscopy as the last step in evaluation of unexplained primary and secondary infertility in 182 patients, out of which 17 cases (21%) were found to have adnexal adhesions for which there was no admitted antecedent history of pelvic inflammatory disease or previous pelvic operation.[14] Peterson et al found peritubal and periovarian adhesions in 32 out of 204 patients.15 In our study, in secondary infertility the cause of adhesions can be attributed to post abortal pelvic inflammation. In primary infertility though no antecedent history of pelvic inflammation was obtained nor any history of incomplete treatment of pulmonary or abdominal TB was found that could have resulted in the formation of residual peritoneal adhesions.

In 3 cases (%) of primary infertility and 5 cases (22.77%) of secondary infertility tubal findings were associated with adhesions. Normal tubes with bilateral spill were present in 1 case (15.3%) of primary infertility and 3 cases (9.0%) of secondary infertility. Adhesions with unilateral tubal block was seen in 1 patient of primary and 1 case of secondary infertility and bilateral tubal block were seen in 1 case of primary infertility and 1 case of secondary infertility. Our findings are in correspondence with

Amaranth and Bhide et al bilateral tubal blockage with adhesions were seen in 29.55% cases.

Chronic infection is very common in genital organs. If chronic infection persists, serous secretions within the endosalpinx produces a hydrosalpinx which may ignite periodically with secondary infection and produce a pyosalpinx or chronic tubo-ovarian mass. According to Table 4, out of 50 cases of infertility, 46 patients (92%) had normal ovaries. In 4 cases (8%), cystic ovary was present on both sides. Sood et al found cystic ovaries in 1.60% in primary infertility. Minawi et al found polycystic ovaries in 4.76% cases which are quite close to our finding.[16]

Limitations

The study was conducted on a small group of population which was one of the limitations of the study. So the results were limited to the study group and doesn't give the major causes of infertility in the population of the area

CONCLUSION

In present study, there were about two third cases of primary infertility and one third cases of secondary infertility. Most of the patients of primary infertility were in the age group of 20-25 years and secondary infertility were in age group 26-30 years. Diagnostic laparoscopy is useful in identifying the various causes of infertility so that a therapeutic intervention can be initiated. Most of the women had unknown cause of infertility with normal uterus, ovaries and fallopian tubes with bilateral tubes being patent. Other common cause was found to be unilateral tubal blockage followed by presence of adhesions. Adhesions were mostly found in woman of secondary infertility. From this study we concluded that hysterolaparoscopy plays an important role in evaluation of infertile female not only in primary but also in secondary infertility. Combined diagnostic laparoscopy and hysteroscopy should be performed in all infertile patients before further treatment. Many diagnostic tests for female infertility only have screening value and gold standards are laparoscopy and hysteroscopy.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Kabadi YM, Harsha B. Hysterolaparoscopy in the Evaluation and Management of Female Infertility. J Obstetr Gynaecol India. 2016;66(1):478-81.
2. Mohamed SG, Ragab MD, Mohamed SA, Shaimaa EMA. Role of hysteroscopy and laparoscopy in evaluation of unexplained infertility. Menoufia Med J. 2019;32(4):1401.
3. Selvaraj P, Parpillewar M, Fidvi J. Diagnostic Hysterolaparoscopy in the Evaluation of Female Factor Infertility: A Cross-sectional Study at a Tertiary Care Hospital in Central India. Int J Infertil Fetal Med 2020;11(2):37-41.
4. Nayak PK, Mahapatra PC, Mallick J, Swain S, Mitra S, Sahoo J. Role of diagnostic hystero-laparoscopy in the evaluation of infertility: A retrospective study of 300 patients. J Hum Reprod Sci. 2013;6(1):32-4.
5. Kumar A, Snehlata, Srivastava M, Vandana RS. Role of diagnostic laparoscopy in infertility. Surgical Review Int J Surg Trauma Orthoped. 2020;6(1):7-14.
6. Mishra S, Sudhir S. Diagnostic hysterolaparoscopy in evaluation of female infertility in a Rural Medical College. Indian J Obstetr Gynecol Res. 2016;3(3):196-8.
7. Nanaware SS, Saswade M, Shende PN, Gaikwad P, Mahana S, Kirane A. Role of Hysterolaparoscopy in the Evaluation of Female Infertility in Tertiary Care Centre. Int J Contemporary Med Res. 2016;3(10):77-83.
8. Anurupa D, Ravikanth GO, Doppa GJ, Purushotham MK. Role of Diagnostic Hysterolaparoscopy in Female Infertility: A Retrospective Study. JMSCR. 2019;07(01):933-8.
9. Panchal DN, Shah A. Role of diagnostic laparoscopy in infertility. Int J Reprod Contracept Obstet Gynecol. 2016;5(12):4180-83.
10. Gupta S, Gupta P, Taly A, Das R. Comparative study-hysterosalpingography and laparoscopy in 120 cases of infertility. J Obst Gyn India. 1984;685-9.
11. Singh M. A comparative analysis of diagnostic laparoscopy and hysterosalpingography in cases of infertility. J Obst Gyn India. 1988;4:471-4.
12. Duignan NM, Jordan JA, Coughlan BM, Logan-Edwards R. One thousand consecutive cases of diagnostic laparoscopy. Int J Obstetr Gynaecol. 1972;79(11):1016-24.
13. Fear RE. Laparoscopy: a valuable aid in gynecologic diagnosis. Obstet Gynecol. 1968;31(3):297-309.
14. Musich JR, Behrman SJ. Infertility laparoscopy in perspective: review of five hundred cases. Am J Obstet Gynecol. 1982;143(3):293-303.
15. Peterson EP, Behrman SJ. Laparoscopy of the infertile patient. Obstet Gynecol. 1970;36(3):363-7.
16. 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.
17. Tulandi T, Arronet GH, McInnes RA. Arcuate and bicornuate uterine anomalies and infertility. Fertil Steril. 1980;34(4):362-4.
18. Nahar LK, Haque N, Kutubi A, Rumana A, Akhter S, Tonny NY, et al. Evaluation of Laparoscopy in Diagnosis of Female Infertility in Females- A Retrospective Study. J Gynecol. 2022;7(4):1-7.

19. Vidyasagar V, Divya TK, Megharaj SS, Sahana, Shyamala, Sudheshna, Nandhini. A study on the organic causes of female infertility by diagnostic hysterolaparoscopy. 2023;9(6):1607-12.
20. Shinde M, Sable U, Shitole R. Should diagnostic hysteroscopy and diagnostic laparoscopy be a combined primary work up in evaluating primary and secondary infertile women? Int J Clin Obstetr Gynaecol. 2019;3(4):84-7.

Cite this article as: Rani LJ, Panda A, Haripriya C. Evaluation of causes of female infertility by hystero laparoscopy. Int J Reprod Contracept Obstet Gynecol 2024;13:1482-7.