



Research Article

Diagnostic laparoscopy in primary and secondary infertility

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Abstract

Background: *The number of couples seeking medical help for infertility is increasing dramatically. This problem is compounded by the trend towards delayed child bearing to achieve socio-economic, educational and professional goals.*

Today, in the era of scientific advancement and technology, newer diagnostic modalities have paved the path for further insight into this problem. Laparoscopy has emerged in recent years as an accurate method of assessing, evaluating and treating infertility.

Aims and Objectives: *To evaluate the role of diagnostic laparoscopy in female with primary and secondary infertility.*

Materials and Methods: *During the study period diagnostic laparoscopy was performed over selected 100 cases under general anaesthesia. A thorough pelvic assessment was made. Chromopertubation was done with methylene blue dye to assess the patency of tubes. Data were analysed as per standered analysis methods.*

Result and Conclusion: *In our study incidence rate of infertility was 11.8%. Laparoscopic surgery has very important roles in infertility cases, not only for investigation, but also for treatment. Before taking for laparoscopy all other factors like male factors need to be ruled out.*

Introduction

Fertility is nature's design to propagate the race. Procreation is a very powerful biological instinct present in all living creatures and human beings are no exceptions.

"God could not be everywhere, And therefore he made mothers."

-A Jewish proverb

Infertility not only a medical problem but has social and psychological impact on the couple. Because of its personal nature, couples may also experience strong religious, cultural and social pressures to conceive. It has been found that females are responsible in 40% cases, male partner in 35% cases, where in combination of both in 10- 20% cases and rest accounts for unexplained infertility.²

Investigating a case of infertility poses challenge to the gynecologists. Till today innumerable investigational aids have been continuously developed and employed in order to find out the various etiological factors. To enumerate some of them like transvaginal ultrasonography (TVS), hysterosalpingography (HSG), and laparoscopy are frequently used.

Laparoscopy is the “Third eye of the gynaecologists” and hence must in every theatre of today’s world. By direct visualization of the abdominal and pelvic organs in laparoscopy allows a definitive diagnosis to be made in many conditions where clinical examination and less invasive techniques such as ultrasound and HSG fail to identify the problem.

It is in question, why an invasive investigating procedure like laparoscopy is needed in an infertility workup; where the option of less invasive modalities like transvaginal sonography is there. The answer is, although in theory, in case of women with normal pelvis, presumed from bimanual examinations and TVS, surgery could be avoided but practically the chances of finding infertility factors in these women by laparoscopy is 30-50%.

TVS is unable to detect tubal pathology, mild endometriosis, and pelvic adhesions, where lay the importance of laparoscopy in detection of subtle or occult pelvic pathology. Chemoperturbation not only reveals patency of tube but also the nature of tubal motility.

In this scenario, the role and place for a newer and high-tech method like laparoscopy needs to be adequately established, so that it is neither overused nor the patients who can really benefit from it are deprived of it.

Thus, in view of the above revelation, the present study is a humble endeavor to establish the role of diagnostic laparoscopy as a simple, safe, effective and accurate tool in the evaluation of infertility.

Aims and Objectives of Study

- To assess the role of diagnostic laparoscopy in the evaluation of female infertility.
- To evaluate the various causes of infertility like endometriosis, PCOD, tubal and peritoneal factors, uterine anomalies and tuberculosis etc., by using diagnostic laparoscopy.
- To determine the reproductive pathology in infertile women using laparoscopy.
- To formulate the line of management in such patients.

Materials and Methods

The present study entitled “Diagnostic laparoscopy in primary and secondary infertility” was conducted in the department of obstetrics and gynaecology in a tertiary care hospital.

Case Selection: A careful and detailed history elicited from patient and her husband as a basic clinical approach with special reference to age of patient, duration of infertility, menstrual pattern, coital habits, any previous contraceptive use, obstetric history in secondary infertility, past medical and surgical history, any past pelvic infection, previous investigations with any treatment and results.

General and systemic examinations were done to exclude any organic disease. Thorough pelvic examinations including per speculum, per vaginal examination, examination of breast and secondary sexual characters were done. Male factor were excluded by seminal fluid examination.

Patients were admitted two days before operation. Routine investigations like haemoglobin, DC, TLC, screening for sickling, BT, CT, TPC, fasting blood sugar, renal function test, liver function test, urine examination, blood grouping and Rh typing were done. Special test like hormonal assay (serum TSH, serum LH, serum FSH, serum Prolactin), ultrasonography (USG) and hysterosalpingography (HSG) were done as per requirement. Cardiology, documented

informed consent and pre-anaesthetic checkup were done one day prior to surgery.

Inclusion Criteria: All infertile patients (primary and secondary) anxious to conceive and ready to undergo diagnostic laparoscopy for evaluation of the same were included in the study.

Exclusion Criteria: Untreated male factor infertility, Suspected pregnancy, Patient not willing to participate in the study, Active PID or recently treated PID within past three months, Patient having contraindications of laparoscopy.

Patients who were having compromised cardiovascular status, severe obstructive airway disease, paralytic ileus, marked obesity, multiple abdominal incision, irreducible external hernias, abdominal wall sepsis, blood dyscrasias and coagulopathy were excluded.

Diagnostic laparoscopy was performed in all the 100 cases under general anaesthesia. A thorough pelvic assessment was made. Chromopertubation was done with methylene blue dye to assess the patency of tubes. Postoperative management of the patients included analgesics for epigastric & shoulder pain due to residual gas in peritoneal cavity, and antibiotic cover. Patients were discharged after 24 hours of observation, if stable. All the patients were asked to follow up in OPD after 7days for removal of skin sutures.

Statistical analysis was done using SPSS software version 16. The continuous variables were expressed as mean ± SD and categorical variables as proportions. The Student's *t* test was used for comparison of continuous variables and Chi square test for proportions.

Observation and Results

In the study 2548 cases of infertility were found amongst 21,569 gynecological cases in our setup. This constitutes 11.8% of incidence rate.

Distribution of Cases according to type of Infertility

The cases consist of primary and secondary infertility as shown in table- 1

Table- 1

Type of infertility	Number of cases (%)
Primary infertility	72
Secondary infertility	28
Total	100

A total of hundred infertility cases studied. Out of which 72 (72%) cases were of primary infertility and 28 (28%) cases were of secondary infertility.

Distribution of cases according to age

The frequency of cases at different age group was as follows:

Table 2

Age in years	Primary infertility		Secondary infertility		Total infertility
	Number	%	Number	%	Number (%)
18- 20	2	2.7	-	-	2
21- 25	36	50	9	32.14	45
26- 30	24	33.34	14	50	38
31- 35	5	6.94	3	10.71	8
36- 40	5	6.94	2	7.14	7
Total	72	100	28	100	100
Mean	25.94± 4.46(SD)		28.21± 4.18(SD)		Statistically significant
Median	25		28		

P value 0.022, t value 2.325

df (degree of freedom) 98, SE of difference 0.97, 95% confidence interval (-4.2 to -0.33)

In our study, majority of patients of primary infertility belonged to the age group of 21-25 years (50%) and that of secondary infertility to 26-30 years (50%). The patients in secondary infertility group were slightly elder compared to primary group (28.21 ± 4.18 vs. 25.94 ± 4.46 years, P value 0.022).7

Laparoscopic Finding in Infertility

Various factors for infertility during laparoscopy were as shown in table 3:

Table-3

Laparoscopic finding	Primary infertility		Secondary infertility		Total infertility
	Number	%	Number	%	Number (%)
Ovarian factors	24	33.33	4	14.29	28
Tubal factors	26	36.11	16	57.14	42
Uterine factors	11	15.26	4	14.28	15
Peritoneal factors	12	16.66	7	24.99	19
Unexplained	12	16.66	4	14.28	16

Tubal factor (42%) was significantly more common than ovarian factor in both group of infertility (p value 0.0379, chi square value 4.308, df 1). Although tubal factor was the most

common cause identified in both primary (36.11%) and secondary infertility (57.14%) but it was highly significant in secondary infertility (p value=0.0279), chi square value 3.661, df 1).

Ovarian factor (33.33%) was significantly different and higher (p value 0.0284, chi square value 3.628, df 1) in primary infertility than secondary infertility (14.29%). Other causes showed no significant difference between them.

Tubal Pathology Detected in Laparoscopy

Various tubal abnormalities detected during laparoscopy in both the group were as follows

Table – 4

Tubal abnormalities	Primary infertility		Secondary infertility		Total infertility
	Number	%	Number	%	Number (%)
U/L tubal block	3	4.17	2	7.14	5
B/L tubal block	8	11.11	3	10.71	11
U/L hydrosalpinx	2	2.78	-	-	2
B/L hydrosalpinx	3	4.16	1	3.57	4
Peritubal adhesion	5	6.94	7	25	12
Tubo-ovarian mass	5	6.94	1	3.57	6
Absent tube	-	-	2	7.14	2
Total	26	36.11	16	57.14	42

In our study, 4 cases of bilateral tubal block and 1 case of unilateral tubal block had associated peritubal adhesions, in addition to 12 cases of isolated peritubal adhesions. Hence a total of 17 cases (17%) had peritubal adhesions.

Ovarian Pathology Detected in Laparoscopy

Distribution of various ovarian pathologies, in both the group of infertility was as shown in table – 5

Table – 5

Ovarian pathology	Primary		Secondary		Total
	Number	%	Number	%	Number (%)
Polycystic ovaries	16	22.22	3	10.71	19
Ovarian cysts	3	4.16	1	3.57	4
Endometriosis	3	4.16	-	-	3
Streak ovaries	2	2.79	-	-	2
Total	24	33.33	4	14.29	28

Majority of infertility patients had PCOD (19%) as an ovarian factor for infertility. In total ovarian factors accounted for 28% of cases of infertility in

our study. The ovarian cysts were of simple variety.

Uterine Pathologies Detected in Laparoscopy

Various uterine pathologies in both the group of infertility was as follows:

Table – 6

Uterine pathology	Primary infertility		Secondary infertility		Total infertility
	Number	%	Number	%	Number (%)
Fibroid uterus	5	6.94	3	10.71	8
Mullerian anomalies	3	4.16	1	3.57	4
Hypoplastic uterus	3	4.16	-	-	3
Total	11	15.26	4	14.28	15

In our study, uterine factors were accounted for 15% of infertility. Congenital anomalies (hypoplastic uterus & Mullerian anomalies) were more commonly seen in primary infertility patients whereas acquired causes (Fibroid uterus) were more commonly seen in secondary infertility patients.

Mullerian anomalies were found in 1 case of secondary infertility (septate uterus) and 3 cases of primary infertility, out of which one had unicornuate uterus and 2 had septate uterus.

Peritoneal Pathology Detected in Laparoscopy

Various peritoneal pathologies in both group of infertility detected during laparoscopy shown in table 7:

Table – 7

Peritoneal pathology	Primary infertility		Secondary infertility		Total infertility
	Number	%	Number	%	Number (%)
Pelvic adhesion	6	8.33	3	10.71	9
Pelvic infection	1	1.39	1	3.57	2
Genital tuberculosis	-	-	1	3.57	1
Endometriosis	5	6.94	2	7.14	7
Total	12	16.66	7	24.99	19

In our study peritoneal factors were accounted for 19% of infertility cases. Pelvic endometriosis was found in a total of 7 cases. As mentioned before, endometriosis in the form of chocolate cyst of ovary was seen in 3 cases. Therefore, total number

of endometriosis cases in our study, were 10 (10%).

In addition, as already mentioned, peritubal adhesions were seen in a total of 17 cases (7 and 10 cases in primary and secondary infertility respectively). Hence, the total number of pelvic adhesions including peritubal, periovarian and omental adhesions was 29 (29%). Overall adhesions were significantly more common in secondary infertility than primary (p value 0.002, chi square 8.329, df 1).

Complications of Laparoscopy

Complications seen during laparoscopic procedure were shown in table 8:

Table – 8

Complications of laparoscopy	Number of cases (%)
Pain in abdomen	4
Pyrexia	1
Bleeding P/V	1
Backache	1
Parietal empysema	3
Shoulder pain	1
Injury to gut	-
Injury to blood vessel	-
Total	11

In our study, no major complications like injury to blood vessel, bowel or bladder injury were noted. Few patients had mild to moderate discomfort in abdomen. However significant abdominal pain and shoulder pain were noted in 4 cases each. Overall the complications rate was 11%.

Discussion

It has been observed that in couples who do not use contraception about 25% will become pregnant in the first month after marriage, 63% will become pregnant in 6 months, and 75% in 9 months, 80% in one year and 90% will be pregnant in 18 months.¹ In the study 2548 cases of infertility were found amongst 21,569 gynecological cases, this constitutes 11.8% of incidence rate. In general infertility affects about 10- 15% of the population¹⁴.

Direct visualization of the internal genital organs with chromopertubation, when added onto

hysterosalpingography and advanced endocrinological study, gives the specialist the necessary armamentarium for diagnosis, treatment and prognosis of the infertile couple.

Diagnostic laparoscopy is usually performed under general anesthesia, with endotracheal intubation to minimize the risk of aspiration. However, if the pressure used for peritoneal insufflation is limited, laparoscopy can be performed under conscious sedation.¹²⁻¹³⁷

Laparoscopy is the gold standard for diagnosing tubal and peritoneal disease, endometriosis, adhesions and other pelvic pathology, because no other imaging technique provides the same degree of sensitivity and specificity.

It should be appreciated that HSG and Laparoscopy are complimentary rather than competitive procedures. The accuracy of diagnosis is enhanced when two procedures are combined especially in those cases where the result of one of the tests is doubtful. In the days of modern gynecology, salpingoscopy and falloscopy via hysteroscope are the alternatives available for assessment of tubal patency.

In present study tubal abnormalities are detected in about half of the infertile females brought to hospital for treatment. The ovulatory disorders were common in primary infertility, and the tubal factor was the commonest factor in both types of infertility in the present study. 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.

Laparoscopy should be considered earlier in women with history of PID, pelvic surgery and chronic pelvic pain for effective treatment decisions. There should be proper guidance and education of infertile women to consult earlier at proper infertility clinic, especially those having dysmenorrhoeal, dyspareunia, irregular cycles and vaginal discharge. Further studies are needed to investigate the etiologies of these abnormalities at the earliest this could be a measure to bring down the occurrence of such conditions.

Conclusion

It has been found that 10-15% of married couples are proved to be infertile all over the world¹⁴. Laparoscopic surgery has very important roles in infertility cases, not only for investigation, but also for treatment. The treatment can be done simultaneously with the diagnostic, especially in cases related to endometriosis, PCOS, hyrosalpinx management and adhesion release.

Laparoscopy is an important diagnostic adjunct in gynecology. Because of the cost and invasive nature of laparoscopy it should not be the first test in the infertile couple for diagnostic evaluation.

In general, semen analysis, assessment of ovarian reserve and documentation of ovulation should be assessed prior to consideration of laparoscopy. For example, if the woman has a clear ovulation problem or her male partner has a severe sperm defect then it is likely that treatment of these problems will provide desired results and help them conceive.

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