

Role of Laparoscopy in Diagnosis of Female Infertility

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ABSTRACT

Introduction: In recent years, laparoscopy has been considered as important tool in diagnosis and treatment of infertility. The main objective of the study was to detect the diagnostic efficacy of laparoscopy in uterine, tubal and ovarian pathologies.

Material and Methods: Present study was carried out in Department of Obstetrics and Gynaecology (U.I.S.E. Maternity Hospital) in collaboration with Department of Radiodiagnosis & Department of Pathology, G.S.V.M. Medical College, Kanpur. Study included sixty cases of both primary and secondary infertility in women. A detailed clinical history especially marital and obstetric history of the patients was taken. Thorough gynaecological examination was done and all necessary investigations (baseline endocrinal investigations, post coital study, cervical mucus study, ovulation study, post menstrual HSG) were done before laparoscopic examination. Written consent form was taken from all the patients.

Results: Among 60 patients, 38 (63.33%) belonged to primary infertility and 22 (36.67%) were of secondary infertility. In primary (57.91%) and secondary infertility (59.1%) maximum number of patient belonged to age group of 21-25 years followed by 21-25 years age group in primary infertility and 31-36 years age group in secondary infertility. Peritubal or peri-ovarian adhesions were present in 15 cases of primary infertility and 5 cases of secondary infertility. Thirty four patients (56.67%) had normal ovaries.

Conclusion: Due to safety and cost effectiveness, laparoscopy is considered as important diagnostic tool for evaluation of cause of infertility in women and for effective treatment decisions.

Keywords: Laparoscopy, Primary Infertility, Secondary Infertility, Tubal Disease.

ovulatory disorders like cystic ovaries, uterine factors like fibroid uterus, endometriosis, tuberculosis and male factor infertility.^{3,4} Pelvic tuberculosis and puerperal infections are leading factors for tubal blockage.^{5,6}

The advent of laparoscopy has helped the gynaecologist to be a mere exact diagnostician than ever before in this discipline. It helps to evaluate the uterine, tubal and ovarian pathology with a single visual inspection in no time. Undetectable peritubal adhesions which often are not visualised by HSG can also be lysed during a laparoscopic examination. Uterine factors like congenital anomalies or fibromyoma of uterus compressing the tubal lumen and ovarian factors like Stein Leventhal syndrome causing polycystic ovaries, endometriosis, peri-ovarian adhesions are important in causation of infertility and are best diagnosed by laparoscopy. Early stages of endometriosis are most difficult to diagnose by pelvic examination, but laparoscopy plays an important role in diagnosis. The laparoscope can be manipulated throughout the pelvic bases for a detailed inspection of the peritoneal surface thus providing an effective method of obtaining early diagnosis in patients with suspected genital T. Diagnostic laparoscopy has been found safe and cost effective in the initial management of young women with infertility.⁷ It is also considered as an important tool for treatment of selected cases.⁸ Therefore aim of present study is to carry out laparoscopy in cases of primary and secondary infertility to diagnose tubal patency, genital tuberculosis and ovulation.

MATERIAL AND METHODS

Present study was carried out in Department of Obstetrics and Gynaecology (U.I.S.E. Maternity Hospital) in collaboration with Department of Radiodiagnosis & Department of Pathology, G.S.V.M. Medical College, Kanpur. Study included sixty cases of both primary and secondary infertility

INTRODUCTION

Infertility is one of the oldest human problems. It has important social religious and psychological implications besides being the cause of anxiety and unhappiness to the sterile couple. Infertility is defined as failure to conceive during one year of frequent unprotected intercourse.¹ In present days, infertility is affecting approximately 9-16% of married couples.² A few patients conceive with more diagnostic procedures while others never do so despite running through a gamut of investigations. Medical science is constantly thriving to achieve such techniques which would bring perfection in diagnosis. Laparoscopy, one of such achievements, offers a simple rapid and safe way to evaluate and diagnose definitely intra abdominal diseases. Main causes of infertility are tubal disease like tubal obstruction, peritubal adhesions, peri-ovarian adhesions,

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How to cite this article: Singhvi N, Kumar S, Singh S, Khan S. Role of laparoscopy in diagnosis of female infertility. International Journal of Contemporary Medical Research 2020;7(9):11-15.

DOI: <http://dx.doi.org/10.21276/ijcmr.2020.7.9.2>



in women. We included only those infertile ladies whose husbands showed normal semen analysis. A detailed clinical history especially marital and obstetric history of the patients was taken.

Thorough gynaecological examination was done and all necessary investigations (baseline endocrinal investigations, post coital study, cervical mucus study, ovulation study, post menstrual HSG) were done. Written consent form was taken from all the patients.

Laparoscopy is a surgical procedure by which endoscopic visualisation of peritoneal and pelvic cavity is done. Instruments required in laparoscopy are laparoscope, pneumoperitoneum apparatus, verres needle and trocar & sleeve.

First step in the laparoscopy is the establishment of pneumoperitoneum. The Verres needle is introduced through a small subumbilical incision and gas is insufflated at one litre per minute with the gas pressure not exceeding 20 mm of Hg. The amount of gas required varies from 1-4 litres. The patient is tilted a little towards the Trendelenberg position and the needle withdrawn. The trocar and sleeve is held in right hand firmly and pushed at an angle of 45° towards the uterus. After removal of the trocar the laparoscope is introduced through the sleeve. The gas insufflator is

now attached to the automatic flow render low pressure to maintain the pneumoperitoneum. The fibre optic cable from the light source is connected to the telescope and observation commences. It gives a panoramic view of the pelvic and lower abdominal contents. An assistant at the vaginal end manipulates the uterus with a sound or dilator. Depending upon the indication the viewing continues. For chromotubation methylene blue or indigo carmine solution is injected through the cervical cannula.

At the conclusion of laparoscopy the insufflation line is disconnected and the laparoscope removed. Gas is allowed to escape by pressing the valve. When the abdomen is flat, the patient is taken of f from the Trendelenberg position and the trocar removed gently with the cannula half way through (to prevent omental prolapse). The wound is closed with a single suture. The examination through the laparoscope was facilitated by semidarkness in the operation theatre. The distal lens was kept at distance of 4-6 cm from the organs studied for correct appreciation of size and contour of the organs like uterus, fallopian tubes, ovaries, pelvic peritoneum etc.

RESULTS

60 cases of infertility were taken into consideration. Out of these 39 cases (63.33%) were of primary infertility and 22 cases (36.67%) were of secondary infertility. (Table 1)

Table 2 depicts the distribution of cases according to the age groups. In primary infertility group, out of 50 cases, maximum number of cases (57.91%) was in the age group 26-30 years followed by age group 21-25 years. The minimum number of cases was in the age group 36 & > 36 years. In the secondary infertility group, the cases varied in the age of 26-38 years. Maximum number of cases were in the age group of 26-30 years i.e. 13 cases (59.1%) and minimum number of cases were in the age group of 36 years and above i.e. 2 cases (9.1%) and rest of the cases are in between 31- 36 years of age.

On diagnostic laparoscopy, out of 60 cases of infertility, adhesions were found in 15 patients of primary infertility and 5 patients of secondary infertility. Peritubal/peri ovarian

Type of Infertility	No. of Cases	Percentage
Primary	38	63.33
Secondary	22	36.67

Table-1: Distribution of cases according to type of Infertility

Age Groups	Primary		Secondary	
	No.	%	No.	%
21-25	10	26.3	-	-
26-30	22	57.9	13	59.1
31-36	05	13.2	07	31.8
36 & above	01	2.6	02	09.1
Total	38	100	22	100

Table-2: Distribution of cases according to Age Groups

S. No.	Findings	Pri-infertility		Sec-infertility	
		No.	%	No.	%
1	Peritubal/peri-ovarian adhesion				
A	Both tube blocked	9	23.68	3	13.7
B	Both tube patent	1	2.63	-	-
C	One tube patent	2	5.26	1	4.5
2	Nothing visualised due to adhesion	3	7.9	1	4.5
3	No adhesions	23	60.52	17	77.3
	Total	38	100	22	100

Table-3: Finding of adhesions on diagnostic laparoscopy

S. No.	Findings	Pri-infertility		Sec-infertility	
		No.	%	No.	%
1	Bicornuate Uterus	3	7.9	-	-
2	Unicornuate Uterus	-	-	-	-
3	Fibroid Uterus	1	2.6	-	-

Table-4: Uterine Abnormality seen on Laparoscopy

S. No.	Findings	Pri-infertility		Sec-infertility	
		No.	%	No.	%
1	B/L Hydrosalpinx with				
A	Both tubes blocked	2	5.26	1	4.5
B	Both tubes patent	-	-	-	-
2	U/L Hydrosalpinx with				
A	Other tube patent	2	5.26	1	4.5
B	Both tube blocked	5	13.15	1	4.5
3	Tubal findings associated with adhesions	15	39.5	5	22.7
4	Normal tube with B/L spill	6	15.8	2	9.0
5	No findings	8	21.05	12	54.5

Table-5: Tubal Findings on Diagnostic Laparoscopy

S. No.	Condition of Ovary	No. of cases	Percentage
	Normal	34	56.67
1	U/L Findings		
	Atrophy	1	1.67
	Cystic Ovary	4	6.67
	T.O. Mass	5	8.33
	Endometriotic deposits	1	1.67
2	B/L Findings		
	T.O. Mass	3	5.00
	Adhesions around ovary	11	18.32
	Sclerosed ovary	1	1.67
	Total	60	100

Table-6: Macroscopic Ovarian Findings on Diagnostic Laparoscopy

Findings	Pri-infertility		Sec-infertility	
	No.	%	No.	%
Tuberculosis	4	10.5	2	9.0
Endometriosis	3	7.9	1	4.5
Fibromyoma	1	2.6	-	-

Table-7: Miscellaneous Findings of Diagnostic Laparoscopy

adhesions with both tube patent were present in 9 cases (23.68%) of primary infertility and 3 cases (13.7%) of secondary infertility. One patient (2.63%) was having adhesions along with patients tubes. In 2 cases (5.26%) in primary infertility and one case (4.5%) in secondary infertility, only one tube was present. Massive adhesions were present in 3 cases (7.9%) of primary infertility and one case (4.5%) of secondary infertility. (Table 3)

Table 4 shows that in Bicornuate uterus was present in 3 cases (7.9%) of primary infertility. Fibroid uterus was present in 1 case (2.6%) of primary infertility.

This table 5 shows that in 2 cases (5.26%) of primary infertility and one case (4.5%) of secondary infertility bilateral hydrosalpinx with bilaterally blocked fallopian tubes was present. In 2 cases (5.26%) of pri-infertility and one case (4.5%) of secondary there was unilateral hydrosalpinx with other tube present. In 5 cases (13.15%) of pri-infertility and one case (4.5%) of secondary infertility there was unilateral hydrosalpinx with both tubes blocked. In 15 cases (39.5%) of pri-infertility and 5 cases (22.77%) of secondary infertility tubal findings were associated with

adhesions. Normal tubes with bilateral spill were present in 6 cases (15.8%) of primary infertility and 2 cases (9%) of secondary infertility.

According to table 6, out of 60 cases of infertility, 34 patients (56.67) had normal ovaries. In one case (1.67%), there was unilateral atrophy of the ovary. In 4 cases (6.67%), cystic ovary was present on one side. Unilateral T.O. mass was present in 5 cases (8.33%) and bilateral T.O. mass were present in 3 cases (5%). Adhesions around ovary were present in 11 cases (18.32%) and sclerosed ovaries were present in one case (1.67%). Endometriosis was diagnosed in one case (1.67%).

Tuberculosis was found in 4 cases (10.5%) of primary infertility and 2 cases (9.0%) of secondary infertility. Primary infertility endometriosis was present in 3 cases (7.9%) and 1 case (4.5%) in secondary infertility. Fibromyoma was present in one case (2.6%) of primary infertility. (Table 7).

DISCUSSION

World widely infertility affects 8-12% couples during their reproductive lives.⁹ Prevalence of primary infertility in India is between 3.9 to 16.8%.¹⁰ The essential principles of good treatment are based on correct diagnosis. As far as the special investigations are concerned we had only HSG and diagnostic laparoscopy at our beck and call. Even the diagnostic laparoscopy could not be carried out fully as there were no facilities for aspiration, cauterization and biopsy taking.

However, with the little diagnostic potential that we had, we conducted our study giving special importance to diagnostic laparoscopy. The present study was conducted on 60 patients, the indications being primary infertility (63.33%) and secondary infertility (36.67%). Our findings are in correspondence with those of Panchal DL et al¹¹ who found the incidence of primary and secondary infertility to be 68% and 32% respectively. Similar findings were observed by various authors like Gupta S et al.¹² This indicates that incidence of primary infertility is higher because of various social factors, marital disharmony and rejection by other members of the family.

In our study the maximum number of cases of primary infertility (57.97%) and secondary infertility (59.1%) was in the age group 26-30 years. In primary infertility, the second common age group was 21-25 years with 26.3% cases, while

in the secondary infertility it was 31-36 years age group with 31.8% cases. Results of our study are in accordance with study done by Panchal DN et al.¹¹ where maximum infertility cases were in age group 21-25 years followed by 26-30 years age groups. Study done by Singh M et al.¹³ also showed similar results. Age incidence in primary sterility 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 of 60 patients of infertility, adhesions were found in 15 cases (39.5%) of primary infertility and 5 cases (22.8%) of secondary infertility. Peritubal and periovarian adhesions with both tubes blocked were present in 9 cases (23.68%) of primary infertility and 3 cases (13.6%) of secondary infertility. One patient (0.63%) of primary Infertility was having adhesions with both tubes patent. In 2 cases (5.26%) of primary infertility and one case (4.5%) of secondary infertility were having adhesions with one tube patent. Massive adhesions were present in 3 cases (7.9%) of primary infertility and one case (4.5%) of secondary infertility. In Duigan et al¹⁴ 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. In our study the incidence of bilateral block is much higher. In his study both tubes were patent in spite of adhesions in 5.4% cases of primary sterility and 5.2% cases of secondary sterility Here the incidence in primary sterility is less and we found no such case in secondary sterility group. Feai et al¹⁵ found 5 patients with peritubal adhesions(18.52%). Murich JR et al¹⁶ 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. Peterson et al¹⁷ found peritubal and periovarian adhesions in 32 out of 204 patients. 6 of these 32 patients had a previous history of pelvic operations; but the remaining 26 patients had no obvious factor contributing to the development of adhesions. Minavi et al¹⁸ found pelvic adhesions in 51(30.35%) out of 168 patients. In our study, in secondary infertility the cause of adhesions can be attributed to post abortal and post partum pelvic inflammation and incomplete anti-tubercular treatment as is seen by the obstetric history and the causative factors discussed under tubal findings. In primary sterility though no antecedent history of pelvic inflammation was obtained, most cases had incomplete treatment of pulmonary or abdominal T.B. and inadequate treatment resulted in the formation of residual peritoneal adhesions.

Uterine abnormality in the form of bicornuate uterus was found in only 3 cases (7.9%) in our study. In one out of 3 cases pathology was in fallopian tubes and they were blocked. The remaining 2 cases had bilateral patency. Tulandi et al¹⁹ did a study on uterine anomalies and infertility and found these in 1.03% cases. Our incidence is more than the above author's incidence. The author found bicornuate uterus in 0.58% cases, and also found arcuate and didelphys

uteri in his study. After metroplasty he reported pregnancy in 65% cases. This proves that the condition is treatable and an effort should be made to unify the uterus in an attempt to affect an early and permanent cure. Fibroid uterus was present in one case (2.6%) of primary infertility. In this case the fibromyoma was present in the fundus of the uterus and the fallopian tubes were attached at a lower level. It was also associated with a cystic ovary but tubes were patent. In this case fibroid itself may be the cause of infertility because of hyperoestrogenism or due to distortion of uterine cavity. In Duigan et al¹⁴, there were 9.5% cases of fibromyoma and Baveja et al²⁰ found 2.8% cases of fibromyoma as a cause of infertility. Tandon et al found an incidence of 1.5% cases of fibromyoma. In our series the incidence was 2.6% which corresponds quite closely to that of Baveja et al.²⁰

As shown in table 5, in 2 cases (5.26%) of primary infertility and one case (4.5%) of secondary infertility bilateral hydrosalpinx with bilateral blocked fallopian tubes were present. In 2 cases 5.26%of primary infertility and one case (4.5%) of Secondary infertility there was unilateral hydrosalpinx with other tube patent. Unilateral hydrosalpinx was associated with bilateral tubal blockade in 5 cases (13.15%) of primary infertility and one case (4.5%) of secondary infertility. Normal tubes with bilateral spill were seen in 6 cases (15.8%) of primary infertility and 2 cases (9.6%) of secondary infertility. Adhesions with bilateral tubal block were seen in 18.4% cases of primary and 9% cases of secondary infertility. Our findings are in correspondence with Amarnath and Bhide et al (1989), 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.

In our study we found that 56.67% of all ovaries of cases of sterility were normal in appearance. It implied that ovarian function in these cases must have been normal. In the remaining abnormal ovarian findings the most common was adhesions around the ovaries in 18.32% cases. In 6.67% cases ovaries were cystic. We could not know the actual pathology because we were not able to take the biopsy of the ovary. In 1.67% cases unexpected endometriosis was found. Endometriosis is known to be associated with infertility. In one case ovary on one side was atrophic and the other ovary was normal. Ovaries were sclerosed in one case, its capsule was thickened. It is mentioned by Shaw (1975) and Jeffcoate (1975) that thickened capsule cannot prevent ovulation but the etiology causing thickening of the capsule may be responsible for infertility. In Duignan's series the incidence of cystic ovaries was 0.4% which is much lower than our finding. Sood K et al found cystic ovaries in 1.60% in primary infertility. Minavi et al¹⁸ found polycystic ovaries in 4.76% cases which are quite close to our finding.

We got many evident features of tuberculosis of abdomen on diagnostic laparoscopy. It was found in 4 cases (10.56%) of primary infertility and 2 cases (9.0%) of secondary infertility.

In 2 cases (5.2%) fallopian tubes were beaded in appearance which shows that its mesosalpinx must have undergone degenerative changes. Incidence of tuberculosis was quite low (0.4%) in Duignan's study¹⁴ whereas Feai et al¹⁵ and Murich et al¹⁶ did not find any case of tuberculosis. However, Baweja et al²⁰ found 22.5% cases of TB in their series and Singh M et al¹³ found TB in 7.29% cases of primary sterility and 8.66% cases of secondary sterility. This shows that there is a high incidence of TB in the cases of infertility in India. There were a total of 4 cases of endometriosis, 3 (7.9%) cases in primary infertility and one case (4.5%) in secondary infertility. In one case there was ovarian endometriosis. In 2 cases (5.27%), endometriotic deposits were found in the pouch of Douglas and multiple adhesions were present between tube and ovary. Feai et al¹⁵ did diagnostic laparoscopy in 27 patients of infertility and found endometriosis in 2 patients (7.4%). Singh M et al¹³ found endometriosis in 6.29% cases. Murich et al¹⁶ found endometriosis in 17 (9.34%) out of 182 patients of unexplained primary and secondary sterility. These figures tally with our figure of 10% indicating that endometriosis is a fairly common cause of infertility in most studies. However, Robert et al found endometriosis in 16.27% cases of infertility. This figure is higher than that in our study and may be explained by the smaller number of cases studied here.

CONCLUSION

In present study, there were about two third cases of primary infertility and one third cases of secondary infertility. Maximum numbers of patients of primary and secondary infertility were in age group 26-30 years. Diagnostic laparoscopy is helpful in identifying the various causes of infertility so that a therapeutic intervention can be initiated. Therefore it is an important tool in the evaluation of infertile females.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 27-06-2020; **Accepted:** 13-07-2020; **Published:** 14-09-2020