



Evaluation of Laparoscopy in Diagnosis of Female Infertility in Females- A Retrospective Study

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Abstract

Introduction: Infertility, one of the most common conditions confronting gynecologists, is defined as inability to conceive after 1 year of regular unprotected sexual intercourse. Infertility is a problem of global proportion. In recent years, laparoscopy has been considered as important tool in diagnosis and treatment of infertility.

Objective: To detect the diagnostic efficacy of laparoscopy in uterine, tubal and ovarian pathologies.

Material and Methods: This was a retrospective study carried out in Department of Obstetrics and Gynaecology, Dhaka Medical College Hospital, Dhaka, Bangladesh from July to December 2022 in collaboration with Department of Radiodiagnosis & Department of Pathology. Study included sixty one cases of both primary and secondary infertility 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. Through 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 61 patients, 39 (63.9%) belonged to primary infertility and 22 (36.1%) were of secondary infertility. In primary (58.9%) 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

Introduction

Infertility, one of the most common conditions confronting gynecologists, is defined as inability to conceive after 1 year of regular unprotected sexual intercourse [1]. Infertility is a problem of global proportion. The World Health Organization (WHO) estimates 60–80 million couples worldwide suffer from infertility [2]. Infertility varies across regions of the world and is estimated to affect 8–12% of couples worldwide [3]. In present days, infertility is affecting approximately 9–16% of married couples [4]. 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, ovulatory disorders like cystic ovaries, uterine factors like fibroid uterus, endometriosis, tuberculosis and male factor infertility [5]. Infertility can be divided into primary and secondary infertility. In primary infertility, no previous pregnancies have occurred, and in secondary infertility, a prior pregnancy although not necessarily a live birth has occurred [6]. Globally, most infertile couples suffer from primary infertility [7]. The female factors contribute most (40–55%) in the etiologies of infertility followed by malefactors (30–40%), both partners (10%), and unexplained (10%) [8]. The importance of diagnostic laparoscopy in female subfertility lies in patients with tubal, peritoneal factors and uterine factors which may be missed on routine clinical examination and imaging modalities. 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 visualized 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 [9]. Laparoscopy can identify milder

degrees of distal tubal occlusive disease, pelvic and adnexal adhesions, endometriosis that may adversely affect fertility [10]. Diagnostic laparoscopy also provides the clinician an opportunity for therapeutic procedure at the time of diagnosis.

Material and Methods

This was a retrospective study carried out in Department of Obstetrics and Gynaecology, Dhaka Medical College Hospital, Dhaka, Bangladesh from July to December 2022 in collaboration with Department of Radio diagnosis & Department of Pathology. Study included sixty one cases of both primary and secondary infertility 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 visualization 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 liter per minute with the gas pressure not exceeding 20 mm of Hg. The amount of gas required varies from 1–4 liters. The patient is tilted a little towards the Trendelenburg 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 fiber optic cable from the light source is connected to the telescope and observation commences. It gives a panoramic view of the pelvic and lowers 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 off from the Trendelenburg 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

61 cases of infertility were taken into consideration. Out of these 39 cases (63.9%) were of primary infertility and 22 cases (36.1%) were of secondary infertility. Tables 1 & 2 depicts the distribution of cases according to the age groups. In primary infertility group, out of 39 cases, maximum number of cases (58.9%) 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 ago 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 61 cases of infertility, adhesions were found in 15 patients of primary infertility and 5 patients of secondary infertility. Peritubal/per ovarian adhesions with both tube patents were present in 9 cases (23.0%) of primary infertility and 3 cases (13.7%) of secondary infertility. One patient (2.5%) was having adhesions along with patients tubes. In 2 cases (5.1%) in primary infertility and one case (4.5%) in secondary infertility, only one tube was present. Massive adhesions were present in 3 cases (7.6%) 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 (7.6%) of primary infertility. Fibroid uterus was present in 1 case (2.5%) of primary infertility. This Table 5 shows that in 2 cases (5.1%) of primary infertility and one case (4.5%) of secondary infertility bilateral hydrosalpinx with bilaterally blocked fallopian tubes was present. In 2 cases (5.1%) of pri-infertility and one case (4.5%) of secondary there was unilateral hydrosalpinx with other tube present. In 5 cases (12.8%) of pri-infertility and one case (4.5%) of

secondary infertility there was unilateral hydrosalpinx with both tubes blocked. In 16 cases (41.0%) 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 (15.3%) of primary infertility and 2 cases (9.0%) of secondary infertility.

According to Table 6, out of 61 cases of infertility, 35 patients (56.3) had normal ovaries. In one case (1.67%), there was unilateral atrophy of the ovary. In 4 cases (6.5%), cystic ovary was present on one side. Unilateral T.O. mass was present in 5 cases (8.1%) and bilateral T.O. mass were present in 3 cases (4.9%). Adhesions around ovary were present in 11 cases (18.0%) and sclerosed ovaries were present in one case (1.6%). Endometriosis was diagnosed in one case (1.6%). Tuberculosis was found in 5 cases (12.8%) of primary infertility and 2 cases (9.0%) of secondary infertility. Primary infertility endometriosis was present in 3 cases (7.5%) and 1 case (4.5%) in secondary infertility. Fibromyoma was present in one case (2.5%) of primary infertility (Table 7).

Type of Infertility	No. of Cases	Percentage
Primary	39	63.93
Secondary	22	36.07

Table 1: Distribution of cases according to type of Infertility (N=61).

Age Groups	Primary		Secondary	
	No.	%	No.	%
21-25	10	25.6	-	-
26-30	23	58.9	13	59.1
31-36	5	12.8	7	31.8
36 & above	1	2.5	2	9.1
Total	39	100	22	100

Table 2: Distribution of cases according to Age Groups (N=61).

S. No.	Findings	Pri-infertility		Sec-infertility	
		No.	%	No.	%
1	Peritubal/peri-ovarian adhesion				
A	Both tube blocked	9	23	3	13.7
B	Both tube patent	1	2.5	-	-
C	One tube patent	2	5.1	1	4.5
2	Nothing visualized due to adhesion	3	7.6	1	4.5
3	No adhesions	24	61.5	17	77.3
	Total	39	100	22	100

Table 3: Finding of adhesions on diagnostic laparoscopy (N=61).

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 (N=4).

S. No.	Findings	Pri-infertility		Sec-infertility	
		No.	%	No.	%
1	B/L Hydrosalpinx with				
A	Both tubes blocked	2	5.1	1	4.5
B	Both tubes patent	-	-	-	-
2	U/L Hydrosalpinx with				
A	Other tube patent	2	5.1	1	4.5
B	Both tube blocked	5	12.8	1	4.5
3	Tubal findings associated with adhesions	16	41	5	22.7
4	Normal tube with B/L spill	6	15.3	2	9
5	No findings	8	20.5	12	54.5

Table 5: Tubal Findings on Diagnostic Laparoscopy (N=61).

S. No.	Condition of Ovary	No. of cases	Percentage
	Normal	35	57.3
1	U/L Findings		
	Atrophy	1	1.6
	Cystic Ovary	4	6.5
	T.O. Mass	5	8.1
	Endometriotic deposits	1	1.6
2	B/L Findings		
	T.O. Mass	3	4.9
	Adhesions around ovary	11	18
	Sclerosed ovary	1	1.6
	Total	61	100

Table 6: Macroscopic Ovarian Findings on Diagnostic Laparoscopy (N=61).

Findings	Pri-infertility		Sec-infertility	
	No.	%	No.	%
Tuberculosis	5	12.8	2	9
Endometriosis	3	7.6	1	4.5
Fibromyoma	1	2.5	-	-

Table 7: Miscellaneous Findings of Diagnostic Laparoscopy (N=12).

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 analyzed. 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. 61 cases of infertility were taken into consideration.

Out of these 39 cases (63.9%) were of primary infertility and 22 cases (36.1%) were of secondary infertility. Tables 1 & 2 depicts the distribution of cases according to the age groups. Our findings are in correspondence with those of Panchal DL, et al. [11] 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 primary infertility group, out of 39 cases, maximum number of cases (58.9%) 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. 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, out of 61 cases of infertility, adhesions were found in 15 patients of primary infertility and 5 patients of secondary infertility. Peritubal/periovarian adhesions with

both tube patents were present in 9 cases (23.0%) of primary infertility and 3 cases (13.7%) of secondary infertility. One patient (2.5%) was having adhesions along with patients tubes.

In 2 cases (5.1%) in primary infertility and one case (4.5%) in secondary infertility, only one tube was present. Massive adhesions were present in 3 cases (7.6%) of primary infertility and one case (4.5%) of secondary infertility (Table 3). In Duigan, et al. [14] 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. Table 4 shows that in Bicornuate uterus was present in 3 cases (7.6%) of primary infertility. Fibroid uterus was present in 1 case (2.5%) of primary infertility. Feai, et al. [15] found 5 patients with peritubal adhesions (18.52%). Murich JR, et al. [16] 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 al. [17] found peritubal and periovarian adhesions in 32 out of 204 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. Table 4 shows that in Bicornuate uterus was present in 3 cases (7.6%) of primary infertility. Fibroid uterus was present in 1 case (2.5%) of primary infertility. Tulandi, et al. [18,19] 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. 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 al. [14], there were 9.5% cases of fibromyoma and Baveja, et al. [20] 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]. This Table 5 shows that in 2 cases (5.1%) of primary infertility and one case (4.5%) of secondary infertility bilateral hydrosalpinx with bilaterally blocked fallopian tubes was

present. In 2 cases (5.1%) of pri-infertility and one case (4.5%) of secondary there was unilateral hydrosalpinx with other tube present. In 5 cases (12.8%) of pri-infertility and one case (4.5%) of secondary infertility there was unilateral hydrosalpinx with both tubes blocked. In 16 cases (41.0%) 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 (15.3%) of primary infertility and 2 cases (9.0%) 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 Amaranth 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.

According to Table 6, out of 61 cases of infertility, 35 patients (56.3) had normal ovaries. In one case (1.67%), there was unilateral atrophy of the ovary. In 4 cases (6.5%), cystic ovary was present on one side. Unilateral T.O. mass was present in 5 cases (8.1%) and bilateral T.O. mass were present in 3 cases (4.9%). Adhesions around ovary were present in 11 cases (18.0%) and sclerosed ovaries were present in one case (1.6%). Endometriosis was diagnosed in one case (1.6%). Tuberculosis was found in 5 cases (12.8%) of primary infertility and 2 cases (9.0%) of secondary infertility. Primary infertility endometriosis was present in 3 cases (7.5%) and 1 case (4.5%) in secondary infertility. Fibromyoma was present in one case (2.5%) of primary infertility (Table 7).

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 al. [18] 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. Feai, et al. [15] did diagnostic laparoscopy in 27 patients of infertility and found endometriosis in 2 patients (7.4%). Singh M, et al. [13] found endometriosis in 6.29% cases. Murich, et al. [16] 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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