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# Laparoscopic presentation in unexplained infertility: a retrospective study

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## Abstract

### Objective

Infertility is a growing challenge for all gynecologists worldwide. There is no definite answer as to what should be the best approach to the management of the couples with unexplained infertility (UI). This study aimed to evaluate laparoscopic diagnostic findings that were helpful in planning the protocol for management of cases of UI.

### Patients and methods

This retrospective study was conducted in Shibeen El Kom Teaching Hospital, Egypt, from January 2012 to October 2017. Data of 250 infertile couples were collected from patient case records and subjected to laparoscopy or combined with hysteroscopy. Intraoperative findings such as endometriosis, pelvic adhesion, presence of peritubal adhesion, pelvic inflammatory disease, uterine polyp, and septum were recorded.

### Results

The present study showed that performing laparoscopy in UI allowed to see and treat abnormalities that might interfere with a woman's ability to conceive a pregnancy. Our study revealed 46% cases had no detectable pathology on laparoscopy; 22 and 16% had minimal and mild endometriosis, respectively; 28% had tubal and peritubal adhesions; and 4% had pelvic inflammatory disease. Laparoscopy findings led to a change of treatment planned for the patients. They were advised either direct intrauterine insemination or assisted reproductive technology/intracytoplasmic sperm injection in cases of severe and moderate endometriosis, without time consumption.

### Conclusion

Laparoscopic procedure is a safe and more precise tool in comprehensive evaluation of UI and can detect various structural abnormalities. This helps in formulating specific plans of management.

**Keywords:** Assisted reproductive technology/intracytoplasmic sperm injection, intrauterine insemination, laparoscopic, ovulation stimulation, unexplained infertility

## INTRODUCTION

Infertility is a growing challenge for all gynecologists worldwide. The incidence of infertility shows marked variations in different countries ranging between 5 and 20% [1–4]. To date, there is no uniform definition for unexplained infertility (UI). A quarter of infertility range (25%) cannot be explained, because the current tests cannot clearly identify the cause; therefore, specific treatment is a challenging issue for the gynecologists [5]. The generally accepted investigation protocol to establish the diagnosis of UI includes semen analysis, assessment of ovulation, uterine factor, and tubal patency [6].

The development of better methods of diagnosis owing to advent of ultrasound, endoscopy, and other modern equipment has changed the whole approach to this problem [5]. The use of laparoscopy in UI workup is still a subject of debate, although laparoscopy remains the gold standard procedure for diagnosing tubal pathology or other pelvic reproductive diseases, such as adhesions and endometriosis [7]. Because of

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its use in reproductive medicine, patients often have questions about how this kind of surgery might affect their chances of getting pregnant. Although it is true that every case is unique, optimal, and prudent use of this minimally invasive technique may actually improve the odds of conception and avert costly treatment like in-vitro fertilization (IVF), but overzealous and unindicated use may compromise future fertility [8].

Timing of laparoscopy has been a controversial issue. In our practice, timing is a matter of individualization. Direct assessment 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 hysterosalpingogram (HSG) fail to identify the problem. Many clinicians thus prefer to treat couples with UI with a few cycles of ovulation stimulation with intrauterine insemination (IUI) before proceeding to laparoscopy. Furthermore, in cases with poor prognosis, laparoscopy could accelerate the commencement of IVF, bypassing the unnecessary cycles of ovulatory stimulation with or without IUI [7]. According to the recent guidelines of the American Society for Reproductive Medicine, there may be a place for diagnostic laparoscopy for young women with a long period (>3 years) of infertility but with no recognized abnormalities [9].

Similarly, visualizing the uterine cavity and identifying the possible pathology have made hysteroscopy an equally important tool in infertility evaluation. Combining hysteroscopy with laparoscopy has emerged as an accurate method of assessing, evaluating, and treating infertility [10]. This study aims to evaluate diagnostic hysterolaparoscopic findings that are helpful in planning the protocol for management cases of UI.

## PATIENTS AND METHODS

This retrospective study was conducted in Shibein El Kom Teaching Hospital, Egypt for a period of 5 years (October 2012–October 2017). Patients diagnosed as having UI of duration more than 3 years, who met the criteria of normal semen parameters, normal HSG findings, ovulation as detected by ovulation testing, and normal hormonal profile, were enrolled for the study. Couples with infertility more than 15 years, female age more than 40 years, history of menstrual irregularities and/or an ovulation, patients with history of abdominal surgery, abnormalities on transvaginal scan like fibroid/adenomyosis, and alterations of male factor were excluded from the study. Because this was a retrospective cohort study, informed consent by the patients was not needed. This study was approved after obtaining ethical clearance from the Ethics Committee of our hospital.

A total of 280 patients presenting to outpatient Department of Obstetrics and Gynecology who satisfied the inclusion criteria were selected and subjected to detailed personal history such as age; duration and type of infertility; menstrual, past, and family history; along with any treatment history like previous

ovulation stimulation, and IUI. Physical examination and gynecological ultrasound examination were carried out. Patients were asked to follow up with next menstrual cycle. Patients were presented and admitted for laparohysteroscopic evaluation in proliferative phase of menstrual cycle. Intraoperative laparoscopic findings such as endometriosis, pelvic adhesion, presence of peritubal adhesion, endometriotic cyst, tubal pathology, and also, hysteroscopic findings were recorded after histopathology. Patient medical records and operative reports were reviewed. One year after laparoscopy, participants were contacted by telephone and asked about the occurrence of pregnancy. Women who got pregnant were asked whether pregnancy was achieved spontaneously, through induction of ovulation, IUI, or through assisted reproductive technology (ART)? In our study, 10.7% (30/280) of patients discontinued or diverted from their scheduled intervention in different stages. Only 250 cases actually completed the study. Operative hysteroscopy needed external qualified staff; therefore, only 50 cases precluded in our study. All data were analyzed using SPSS, version 11, IBM International Business Machines Corp., New Orchard Road, Armonk, New York 10504, 914-499-1900. Frequency and percentages were calculated to describe the results.

## RESULTS

The present study included 250 cases that fulfilled the criteria. The mean age of the patients was  $26.2 \pm 3.11$  years, and the mean duration of infertility at the time of presentation was  $5.1 \pm 2.1$  years. A total of 180 (72%) cases had primary infertility and 70 (28%) cases had secondary infertility. Moreover, 50 (20%) cases had previous failed IUI, as given in Table 1.

Our study revealed that 46% of cases had no detectable pathology on laparoscopy; 22 and 16% had minimal and mild endometriosis, respectively; 28% had tubal and peritubal adhesions; and 4% had pelvic inflammatory disease (Table 2). There were no complications in laparoscopy in 55 (22%) cases (Table 3). Of the 50 cases included in diagnostic hysteroscopy, 35 (70%) cases had normal findings and 15 (30%) had abnormal pathology (eight cases of polyp, four cases of uterine septum, and three cases of intrauterine adhesion) (Table 4).

Conducting a surgical procedures in the same operating time was done by laparoscopy ( $n = 250$ ) (32% adhesiolysis, 18.8%

**Table 1: Demographic data of the patients ( $n=250$ )**

Parameters	Value
Age (years)	26.2±3.11
BMI (kg/m <sup>2</sup> )	25.5±2.1
Duration of infertility (years)	5.1±2.1
Type of infertility	
Primary	180 (72)
Secondary	70 (28)
Previous IUI done	50 (20)

Data are presented as mean±SD and  $n$  (%). IUI, Intrauterine insemination.

excision or cautery of endometriosis spots, and 3.2% ovarian cystectomy) and hysteroscopy ( $n = 50$ ) (16% polypectomy, 8% excision of septum, and 6% excision of intrauterine adhesion) (Table 5).

Of the 250 patients, findings at laparoscopy led to change of treatment planned for 38. Of these patients, 35 were advised direct IUI (three cases got pregnant), whereas three cases were advised further ART/intracytoplasmic sperm injection (ICSI) (one case achieved pregnancy). Only 37 patient were followed within 1 year with expectant management (20 women achieved pregnancies) and 170 patients with ovulation induction (64 cases got pregnant). In this study, 88 (35.2%) cases achieved pregnancies with different treatment plan in UI (Table 6).

## DISCUSSION

UI is a taxing diagnosis for both the patient and the clinician. The treatment is empirical and depends on the availability of resources [11]. The performance of laparoscopy in UI provides diagnostic findings that are helpful in global management of the cases and enables some patients to get pregnancy, comparable to ART [12]. Until recently, laparoscopy is the final diagnostic procedure of female fertility exploration, as outlined by the WHO guidelines [13]. It may also be therapeutic, with treatment being subtle tuboperitoneal factors [11]. In this study, we tried to evaluate the laparoscopic presentation in diagnosis and treatment of adhesions and treatment of minimal and mild endometriosis in cases of UI in our setup.

In the current study, laparoscopic findings were strictly normal in only 46%, whereas endometriosis and/or pelvic adhesions (tubal and peritubal) were observed 50 and 28%, respectively. These results were approximately similar to those quoted from Capelo *et al.* [14] and Bhandari *et al.* [15]. The percentage of normal findings in our study was higher than the study by Capelo (36%) owing to higher number of patients who had not been treated previously.

In this study, the laparoscopic evaluation of a woman with UI led to a change in procedure for the best and the quickest alternative treatment plan like direct referral to an IVF/ICSI when dense pelvic adhesions and/or severe endometriosis not amenable to treatment were encountered in cases with poor prognosis, which is in agreement with Bonneau *et al.* [6].

Our study was undertaken to find the hysteroscopic findings in 50 of 250 cases, as operative hysteroscopy needed external qualified staff. The uterine pathology was seen in 30% of patients. Eight cases of uterine polyp and four cases of uterine septum were the intrauterine abnormalities in our study, which were undiagnosed by prior ultrasonography. The role of endometrial polyps in infertility has not been clearly defined, though a prospective study of 224 infertile women who underwent hysteroscopy observed a 50% pregnancy rate after of polypectomy [16]. Currently, the modern operative hysteroscopic techniques have made it a relatively easy and

**Table 2: Laparoscopic findings ( $n=250$ )**

Findings	Values
Normal tubes and ovaries	115 (46)
Minimal endometrioses	55 (22)
Mild endometrioses	40 (16)
Moderate endometrioses	20 (8)
Severe endometrioses	2 (0.8)
Endometrioses cyst	8 (3.2)
Adhesions (tubal and peritubal)	70 (28)
PID	10 (4)
Failure to visualize	0

Data are presented as  $n$  (%). The total number of laparoscopic findings exceeds the number of patients because some patients had more than one finding. PID, pelvic inflammatory disease.

**Table 3: Complications of laparoscopy**

Complications	Value
Pyrexia	50 (20)
Right shoulder pain	25 (10)
Nausea/vomiting	120 (48)
No complications	55 (22)

Data are presented as  $n$  (%).

**Table 4: Hysteroscopic findings**

Findings	Value ( $n=50$ )
Normal	35 (70)
Polyp	8 (16)
Septum	4 (8)
Intrauterine adhesion	3 (6)

Data are presented as  $n$  (%).

**Table 5: Procedures are done during laparoscopy/hysteroscopy**

Procedures	Value
Laparoscopy ( $n=250$ )	
Diagnostic only	115 (46)
Adhesiolysis	80 (32)
Endometriosis spots (excision or cautery)	47 (18.8)
Ovarian cystectomy	8 (3.2)
Hysteroscopy ( $n=50$ )	
Diagnostic only	35 (70)
Polypectomy	8 (16)
Excision of septum	4 (8)
Excision of intrauterine adhesions	3 (6)

Data are presented as  $n$  (%).

brief day-care procedure with low morbidity and prompt recovery.

In a meta-analysis by Bosteels *et al.* [17], an increasing trend toward pregnancy was noted after laparoscopy, especially when mild to moderate endometriosis was noted, and the results of reproductive surgery for cases of UI were not uniform and even conflicting in some large trials. In this study, we found

**Table 6: Management options and resultant pregnancy within 1 year of after laparoscopy/hysteroscopy**

Options	Value (n=250)	Pregnancy [n (%)]
Expectant management	37 (14.8)	20 (54)
Ovulation induction	175 (70)	64 (36.5)
IUI	35 (14)	3 (8.5)
ART/ICSI	3 (1.2)	1 (33.3)

ART/ICSI, assisted reproductive technology/intracytoplasmic sperm injection; IUI, intrauterine insemination.

that in the 250 patients who underwent laparoscopy, the overall pregnancy rate was 35.2% (88 cases) within 1 year. This is comparable with a study by Tsuji *et al.* [18], where laparoscopy was done in 57 patients with UI and an abnormality was detected in 46 (80.7%) cases. A pregnancy rate of 44.4% was seen in cases that required operative intervention. In this study, 135/250 (54%) cases showed abnormality on laparoscopy, which is lesser than that seen by Tsuji *et al.* [18] explaining the difference in pregnancy rate owing to higher number of patients (250 cases) in our study.

This is to be considered in light of the fact that many patients received different types of treatment within 1 year after laparoscopy. Expectant management was done in 14.8% of cases and achieved pregnancy in 54% of them in our study. Most of these women had no cause for infertility identified by laparoscopy/hysteroscopy. Mahran *et al.* [19] explained that the higher pregnancy rate may reflect that in women with UI, it may be better to treat them expectantly for a longer time before deciding to perform a laparoscopy.

This study attempts to answer one of the most common questions encountered – what should be the timing of laparoscopic presentation and next steps in UI? In our study, timing was based on individual patient characteristics such as age of patients, treatment efficacy, and cost considerations. We prefer to treat couples with UI with a few cycles of ovulation stimulation with or without IUI logically leading to a reduction in the number of negative laparoscopies and high cost of this surgical procedure, with a change in treatment modality such as expectant management, operative laparoscopy, ovulation induction, IUI and IVF/ICSI. As per NICE guidelines, IVF should be done after 2 years of unprotected regular intercourse in explained infertility [20].

The strengths of this study include the surgical procedure is performed by the same team, minimizing the bias of interoperator variability, except operative hysteroscopy, which was done by external staff.

A limitation of this study is the exclusion of patients who discontinued their intervention plan as it prolonged duration. This may be useful in eliminating bias. Operative hysteroscopy needed external qualified staff; therefore, only 50 cases underwent this procedure in our study.

## CONCLUSION

This study thus clearly demonstrates the benefit of laparoscopy presentation for the diagnosis and facilitates the decision-making progress about UI treatment strategy, with the added benefit of by maximizing time spent and reducing financial expenditure. We were able to achieve a higher conception rate of 35.2% among cases owing to operative procedures at the time of laparoscopy, which can enhance conception, naturally, or with IUI and IVF/ICSI, such as lysis of adhesions, cauterization, and excision of endometriosis.

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## Conflicts of interest

There are no conflicts of interest.

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