

Role of Hysterolaparoscopy in The Evaluation and Management of Female Infertility

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ABSTRACT

Background: The definition of infertility is one year of unprotected intercourse with no pregnancy among married couples.

Objective: The aim of the study is to assess the efficacy and safeness of combined hysterolaparoscopy on evaluation and management of female infertility.

Patients and Methods: A prospective clinical triad study was carried on 416 patients infertile women aged between 18 and 42 years with either primary or secondary infertility with normal hormone profile and without male factor infertility at the Cytogenetics and Endoscopy Unit, at Zagazig University. Those females underwent both hysteroscopy and laparoscopy through the period from August 2017 to July 2018.

Results: This study showed that 42.7% of primary infertility and 59.5% of secondary infertility cases did not have any abnormality detected on laparoscopy. Endometriosis was the most common abnormality found in primary infertility followed by peritoneal adhesions, which was (12.2%) the most common abnormality found in second infertility followed by endometriosis. Abnormality in cases of primary infertility was intrauterine septum, and in secondary infertility was intrauterine synechia.

Conclusions: Diagnostic hysterolaparoscopy is a very safe and effective tool for the evaluation of infertility particularly for detection of conditions like endometriosis, tubal adhesions, and intrauterine septum.

Key words: Female infertility, Infertility, Hysteroscopy, Laparoscopy.

INTRODUCTION

Infertility is defined as failure to conceive during 1 year of unprotected frequent intercourse. It affects approximately 10–15% of couples. Leading cause of infertility includes tuboperitoneal disease (40–50 %), ovulatory disorders (30–40 %), uterine factor (15–20 %) and male factor infertility (30–40 %). Hysterolaparoscopy is an excellent diagnostic modality to detect hidden pathology in patients without any overt clinical manifestations. Laparoscopy can reveal the presence of peritubal adhesions, periadnexal adhesions, tubal pathology and endometriosis in 35–68 % of cases even after normal HSG ⁽¹⁾. Diagnostic hysteroscopy is an equally important modality to detect uterine anomalies and other intrauterine pathologies ⁽²⁾.

The definition of infertility is one year of unprotected intercourse with no pregnancy among married couples ⁽³⁾. Couples with primary infertility have never been able to conceive while, on the other hand, secondary infertility is difficulty in conceiving after already having conceived (and either carried the pregnancy to term or had a miscarriage) ⁽⁴⁾.

In gynecology, endoscopes are used most often to diagnose conditions by direct visualization of the peritoneal cavity (laparoscopy) or the inside of the uterus (hysteroscopy) ⁽⁵⁾. It has affected every area of gynecology, from diagnosis to therapy, from reproductive medicine to urogynecology to oncology ⁽⁶⁾.

It gives the surgeon an opportunity to have access to patient's diseased organs, remove abnormal tissue and reconstruct damaged organs ⁽⁷⁾. Much more than is

the case with conventional surgery, endoscopic surgery relies heavily not only on the skill of the surgeon but also on technology ⁽⁶⁾.

Similarly, visualizing the uterine cavity and identifying the possible pathology made hysteroscopy an equally important tool in infertility evaluation. Additionally, hysteroscopic guided biopsy and therapeutic procedures like polypectomy, myomectomy, septal resection, and adhesiolysis can be done in the same setting ⁽⁸⁾.

The question of tubal morphology and patency, ovarian morphology, any unsuspected pelvic pathology, and uterine cavity abnormalities can all be resolved with accuracy at one session by hysterolaparoscopy ⁽⁷⁾.

Hysterolaparoscopy may appear to be invasive, but it may become more beneficial, as diagnosis and therapeutic interventions can be done at the same setting. Thus, the entire procedure becomes “prognostic and therapeutic oriented rather than only diagnostic” ⁽⁷⁾.

The aim of the study is to assess the efficacy and safeness of combined hysterolaparoscopy on evaluation and management of female infertility

PATIENTS AND METHODS

A prospective clinical triad study was conducted at the Cytogenetics and Endoscopy Unit, at Zagazig University from August 2017 to July 2018, on 416 patients infertile women aged between 18 to 42 years.

Inclusion criteria: Women aged 18–42 years. Primary or secondary infertility with normal hormone profile and without male factor infertility.



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Exclusion criteria: Suspicion of pregnancy. Women with severe cardiac/respiratory illness, acute generalized peritonitis, anesthetic problems, diabetes mellitus, severe anemia, sexually transmitted diseases, severe urinary tract infection. Women undergoing hysterolaparoscopy for causes other than infertility.

The collected data were demographic factors such as age, duration and type of infertility, abdominal examination, complete blood picture, liver and renal function tests, and coagulation profile.

Ethical approval:

Written informed consent was obtained from all participants. **The study was approved by the Research Ethical Committee of Faculty of Medicine, Zagazig University.** The work was carried out for studies involving humans in accordance with the World Medical Association's Code of Ethics (Helsinki Declaration).

Method:

Diagnostic Hysterolaparoscopy was carried out in infertile patients in early follicular phase under general anesthesia after the opinion of the anesthetist.

A rigid 30 degrees 4-mm hysteroscope (Karl Storz Endoscopy) was used for diagnostic hysteroscopy. Hysteroscopy was introduced and the cervical canal, uterine cavity, endometrium and both ostia were thoroughly inspected. The uterine cavity was distended with normal saline solution at pressure of 80-120 mmHg. Various fertility enhancing surgeries were simultaneously performed. Therapeutic interventions in the form of septal resection, polypectomy, myomectomy, removal of calcified endometrium and synechiolysis (adhesiolysis) were done wherever required by operative scope (2.9 mm diameter). This was followed by diagnostic laparoscopy.

Karl Storz laparoscope (10 mm diameter trochar) was introduced after creating pneumoperitoneum intraumbilically and through inspection of uterus, anterior and posterior cul de sacs, fallopian tube, ovaries and the rest of pelvic peritoneum, appendix and liver surface was performed. Any abnormality seen was noted, including adhesions.

Chromopertubation was done in all of our cases using dilute methylene blue dye. Therapeutic interventions were performed at the same sitting like adhesiolysis, operative procedure for endometriosis, myomectomy, cystectomy, cyst aspiration, salpingectomy, fimbrioplasty, fimbrial cystectomy and surgeries for uterine anomalies wherever required.

Any relevant positive findings in hysterolaparoscopy were noted and incidence of different lesions was calculated. Therapeutic interventions were also noted and tabulated.

Statistical Analysis

Appropriate statistical measurements like mean, number, and percentages were used to represent the results of the study. Chi-Square test X^2 was used to test the association variables for categorical data. Fisher's exact (FE) test is used when you have two nominal variables. Fisher's exact test is more accurate than the chi-squared test when the expected numbers are small. Student's t-test was used to assess the statistical significance of the difference between two population means in a study involving independent samples. P-value less than 0.05 was considered significant. Microsoft office was used for making tables and statistical analysis.

RESULTS

This study showed that there was no significant difference between the studied groups as regard age distribution (Figure 1).

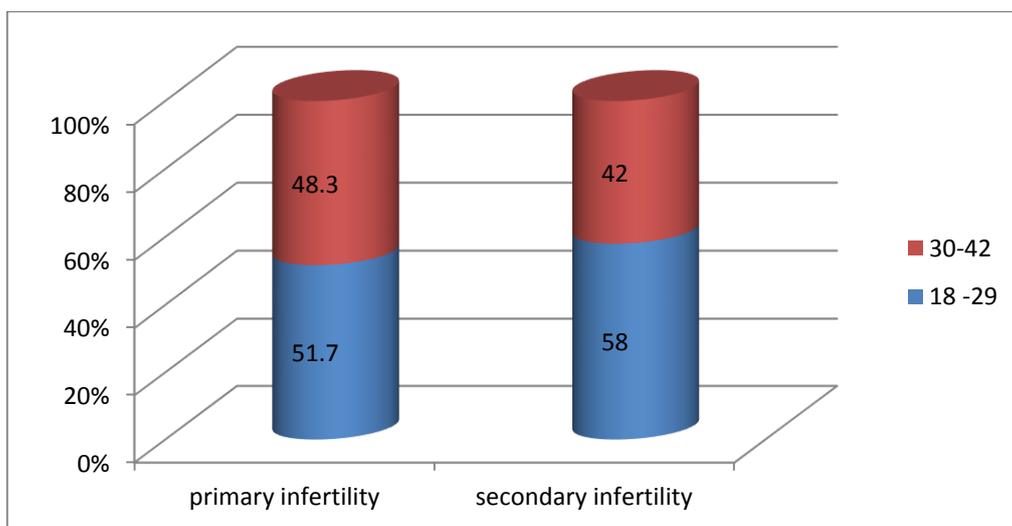


Fig. (1): Bar chart of age distribution.

This study showed that there was no statistical significant difference between the studied groups as regard prevalence of normal and abnormal hystrolaprosopic findings in infertile women (Table 1).

Table (1): Prevalence of normal and abnormal hystrolaprosopic findings.

Procedure	Primary infertility (N=290)		Secondary infertility (N=126)		χ^2	p-value
	N	%	N	%		
Hystrolaproscopy					0.04	0.84
Normal	80	27.5	36	28.5		
Abnormal	210	72.5	90	71.5		

This study showed that 42.7% of primary infertility and 59.5% of secondary infertility cases did not have any abnormality detected on laparoscopy. Endometriosis was found to be the most common abnormality found in primary infertility followed by peritoneal adhesions. Peritoneal adhesions (12.2%) was most common abnormality found in second infertility followed by endometriosis (Table 2).

Table (2): Laparoscopic findings among the studied groups

Findings	Primary (290)	Secondary (126)	Total(416)
Normal	124 (42.7%)	75 (59.5%)	199 (47.8%)
Endometriosis	43 (14.8%)	9 (7.1%)	52 (12.5%)
Tubal pathology	33 (11.3%)	11 (8.7%)	44 (10.6%)
Ovarian cysts	20 (6.8%)	3 (2%)	23 (5.5%)
PCO	26 (8.2%)	13 (10.2%)	39 (9.6%)
Adhesion	38 (13.1%)	14 (11.1%)	52 (12.2%)
Anomalies of uterus	6 (2%)	1 (0.7%)	7 (1.6%)
Myoma	2 (0.7%)	1 (0.6%)	3 (0.7%)

This study showed that the commonest reported hysteroscopic abnormality in cases of primary infertility was intrauterine septum, and the commonest reported hysteroscopic abnormality in cases of secondary infertility was intrauterine synechia (Table 3).

Table (3): Hysteroscopic findings of the studied groups

Finding	Primary (290)	Secondary(126)	Total(416)
Normal	176 (60.6%)	55 (43.6%)	231(55.5%)
Septum	46 (15.5%)	26 (20.6%)	72 (17.3%)
Polyp	25 (8.2%)	7 (5.5%)	32 (7.9%)
Myoma	6 (2%)	2 (1.5%)	8 (1.9%)
Synechiae	26 (9%)	30 (23.8%)	56 (13.4%)
Osteal fibrosis	7 (2.4%)	4 (3.1%)	11 (2.6%)
Thickened polypoidal endometrium	4 (1.3%)	2 (1.5%)	6 (1.4%)

Our study showed tubal block comprised in unilateral 8.5% primary infertility, while secondary infertility 2% in bilateral (Figure 2).

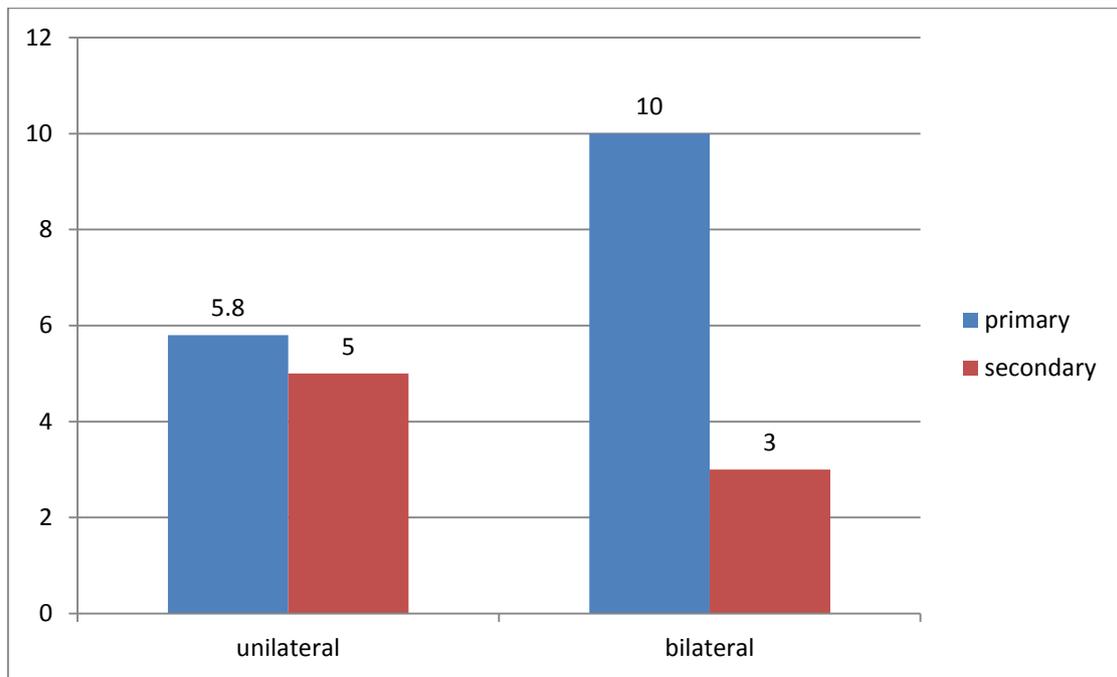


Fig. (2): Prevalence of tubal block among cases.

Hysteroscopy in this study showed 21.5% of cases were operative for myomectomy/polypectomy and 39% operative for septal resection as well as 30.27% had adhesiolysis (Figure 3).

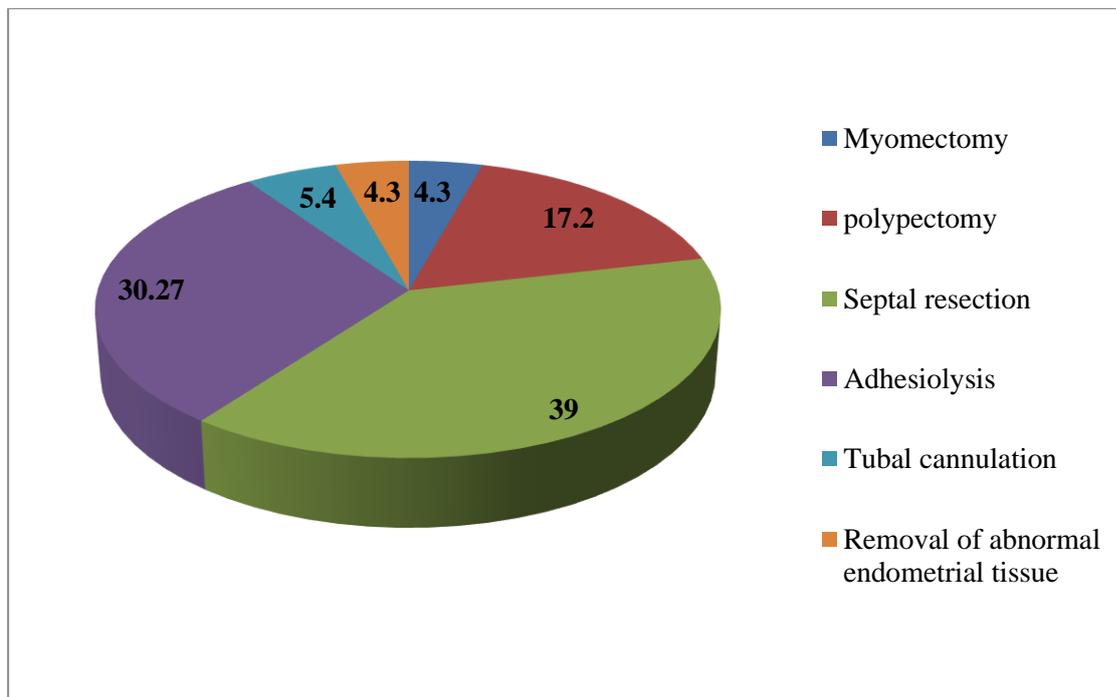


Fig. (3): Hysteroscopic interventions in infertile patients.

This study showed that the laparoscopic interventions detected 23.04% of patients had done operative procedures for endometriosis and 23.5% of patients underwent adhesiolysis as well as 18% of them underwent ovarian drilling (Figure 4).

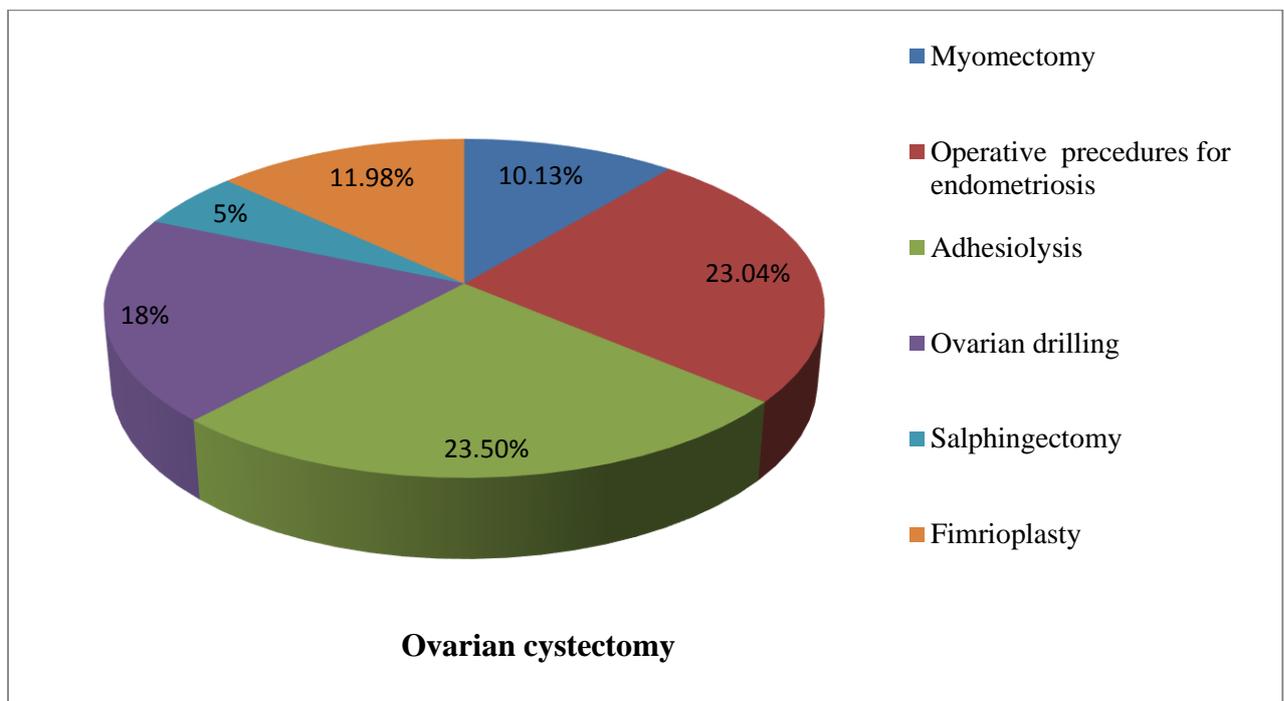


Fig. (4): Laparoscopic interventions in infertile patients.

DISCUSSION

In this study, 71% of women had primary infertility and 29% of women had secondary infertility. These results agree with those obtained from **Nayak et al.** ⁽⁹⁾ (a study of 300 patient to evaluate role of hysterolaparoscope in infertility work up) where 69% had primary infertility and 31% had secondary infertility.

Similar results were seen in another study by **Shetty** ⁽¹⁰⁾ that showed 68% of cases had primary infertility and 32% of cases had secondary infertility.

In current study, 53.8 % women were in the age group (18-42) years while 46.1 % were more than 30 years of age. Nearly similar result was found in **Ashraf** ⁽¹¹⁾ (retrospective study over 4 years conducted to 317 infertile women to assess the role of diagnostic hysterolaparoscopy in infertility). The study showed 68.8% women were in the age group of 20-30 years while 31.2% infertile women were more than 30 years of age. Also **Shah et al.** ⁽¹²⁾ in their study found that 63% patients were among 20-30 years of age group with mean age of 26.5 years.

In our study laparoscopic findings were normal in 47.8 % cases and abnormal in 52.2% cases. The most common abnormality detected on laparoscopy was endometriosis found in 12.5 % of cases. This was followed by peritoneal adhesions found in 12.2 % and tubal pathology found in 11.1%. Peritoneal adhesions can occur due to previous pelvic infection, surgery or endometriosis. Endometriosis and peritoneal adhesions distort the tubo-ovarian relationship and prevent the ovum pickup even though the tubes are normal. Laparoscopy is the gold standard for diagnosis of these disorders and has an advantage of performing corrective surgery in the same sitting ⁽¹³⁾. Endometriosis,

peritoneal adhesions and tubal pathology account for the primary diagnosis in majority of infertile couples in our study. These results don't meet with those of **Tsuji et al.** ⁽¹³⁾ (a retrospective study on 300 patients to show benefit of diagnostic laparoscopy with unexplained infertility) who reported normal findings in 22% of cases and abnormal in 78% of cases.

Similar results were found in **Ashraf** ⁽¹¹⁾ that endometriosis found in 31.5 % of cases followed by peritoneal adhesions 17 % and tubal pathology 14.5%.

In a retrospective study, **Capelo et al.** ⁽¹⁴⁾ performed diagnostic laparoscopy in 92 patients after four failed cycles of ovulation induction treatment with clomiphene citrate. Laparoscopic findings were strictly normal in only 36% of cases, whereas endometriosis and/or pelvic adhesions were observed in 50% and 33% respectively.

Several other studies also reported endometriosis, adnexal adhesion and tubal disease as the major pathologies among infertile patients similar to our study ^(11, 14). Evaluation of uterine cavity is one of the most important steps in the work up of infertile couple. Hysteroscopy is nowadays considered as the most definite technique for evaluation of uterine cavity in infertile women since it aids not only in diagnosing the pathology but also its simultaneous management. The most common intrauterine pathology found in this study was uterine septum (17.3%) which was undiagnosed by prior ultrasound. Previous studies also showed intrauterine septum as the most common intrauterine pathology detected in infertile women ⁽¹¹⁾.

Although a diagnosis of septate uterus per se is not an indication for septoplasty, the reproductive performance of women with an uncorrected septum is rather poor with most losses occurring in the first

trimester. Pregnancy outcomes dramatically improve after surgical correction⁽¹⁵⁾.

Previously, surgical correction of septate uterus was requiring an abdominal metroplasty, which was associated with increased morbidity and future pregnancy complications due to scarred uterus. Currently, the modern operative hysteroscopic techniques have made it a relatively easy and brief day care procedure with low morbidity and prompt recovery⁽¹⁶⁾. Therefore, septal resection is recommended more liberally nowadays.

Intrauterine synechiae was the second most common cause of infertility found in our study seen in 13.4% of infertile females with higher incidence in secondary infertile cases. The reason for higher incidence of synechiae formation in secondary infertility may be because this group had previous history of interventions like dilatation and curettage. A study by **Nanaware et al.**⁽¹⁶⁾ also reported uterine synechiae as the most common finding detected in secondary infertility.

The third most common pathology found in infertile women in our study was endometrial polyp (7.9%). The incidence of asymptomatic endometrial polyps in women with infertility was reported to range from 10% to 32%⁽¹⁷⁾.

Shokeir et al.⁽¹⁷⁾ did a study to determine incidence of endometrial polyps on hysteroscopy in an infertile eumenorrhic population. Out of 244 women who underwent hysteroscopy, endometrial polyp was found in 36 (13.53%) patients.

Also it was found that 50% pregnancy rate was achieved by hysteroscopic polypectomy. Similar observation were made in other studies also as in **Nayak et al.**⁽⁹⁾.

Hence it was concluded that diagnostic hysteroscopy should be used routinely in the work-up of infertile woman and persistent functional endometrial polyps, even if small, are likely to impair fertility so removal of such lesions should be done to improve subsequent reproductive performance.

There was no surgical or anesthetic complication in any of our operated patients except minimal abdominal pain and minimal per vaginal bleeding in some.

CONCLUSIONS

Diagnostic hysterolaparoscopy is a very safe and effective tool for the evaluation of infertility particularly for detection of conditions like endometriosis, tubal adhesions, and intrauterine septum.

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