European Journal of Obstetrics & Gynecology and Reproductive Biology 163 (2012) 57–61

Contents lists available at SciVerse ScienceDirect

European Journal of Obstetrics & Gynecology and Reproductive Biology

journal homepage: www.elsevier.com/locate/ejogrb

# Use of laparoscopy in unexplained infertility

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ARTICLE INFO

*Article history:*
Received 19 August 2011
Received in revised form 21 November 2011
Accepted 22 March 2012

*Keywords:*
Unexplained infertility
Laparoscopy
Endometriosis
Pelvic adhesions
Tubal disease

ABSTRACT

*Objective:* The use of laparoscopy in unexplained infertility work-up is still a subject of debate, although laparoscopy remains the gold standard for diagnosis and treatment of several pelvic pathologies. The objective of this study was to assess the rates and types of pelvic pathologies observed during diagnostic laparoscopy, and the pregnancy rate in couples with unexplained infertility following laparoscopy.
*Study design:* Prospective study, from November 2003 to October 2009, including 114 infertile, spontaneously ovulating women with normal clinical examination, ovarian reserve assessment, pelvic ultrasound scan and patent tubes on hysterosalpingography. Semen analyses were normal according to the World Health Organization criteria. After three cycles of ovulation induction with or without intra-uterine insemination and no pregnancy, women were referred for diagnostic laparoscopy.
*Results:* Laparoscopy revealed pelvic pathology in 95 patients. Endometriosis, pelvic adhesions and tubal disease were observed and treated in 72, 46 and 24 patients, respectively. Following laparoscopy, bilateral and unilateral tubal patencies were observed in 107 and five patients, respectively. Pregnancy was observed in 77 out of 102 patients who tried to conceive after surgery, 35 of whom conceived using their own tubes.
*Conclusion:* Diagnostic laparoscopy should be strongly considered in unexplained infertility work-up, and tubal efficiency should not be underestimated.



## 1. Introduction

In the USA, 10–15% of couples are diagnosed with infertility (failure to conceive after ≥1 year of regular, unprotected intercourse) [1]. After a standard work-up, the cause of infertility remains unexplained in 10% of couples [2,3].

Unexplained infertility has no standard work-up. Findings depend on the quantity, quality and interpretation of investigations. The more examinations that are undertaken, the more pathologies are found, but this also increases the invasiveness and iatrogenicity.

The American Society of Reproductive Medicine (ASRM) described the optimal assessment of infertile couples [4], proposing careful history-taking and physical examination. Subsequent evaluations should provide evidence of ovulation (basal body temperature or mid-luteal-phase serum progesterone), uterine integrity (ultrasound), adequate sperm production (semen analysis) and patency of the fallopian tubes (non-systematic hysterosalpingography) [4]. At the authors' centre, ovarian reserve markers, postcoital tests and hysterosalpingography are also used routinely.

Diagnostic laparoscopy is generally accepted as the gold standard for diagnosing tubal pathology or other pelvic reproductive diseases, such as adhesions and endometriosis. Once identified, appropriate surgical treatment can be given, enhancing the chance of spontaneous conception. Furthermore, in cases with a poor prognosis, laparoscopy could accelerate the commencement of in vitro fertilization (IVF), bypassing unnecessary cycles of ovulatory stimulation with or without intra-uterine insemination (IUI).

Systematic laparoscopy exposes patients to the risks of general anaesthesia, hazards of surgical complications and adhesion formation. Fertility surgery is regularly bypassed by IVF to protect patients and reduce costs [5].

The objectives of this study were to assess: (1) the rates and types of pelvic pathologies observed during laparoscopy in women with unexplained infertility, (2) pre-operative predictive factors for significant pelvic pathologies, and (3) the pregnancy rate in infertile women following laparoscopy.

## 2. Materials and methods

Between November 2003 and November 2009, 114 patients were included in the study and underwent surgery for unexplained infertility.

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http://dx.doi.org/10.1016/j.ejogrb.2012.03.036

### 2.1. Inclusion criteria

Patients with unexplained infertility met the following criteria: (i) infertile for >18 months; (ii) normal clinical examination; (iii) spontaneous ovulatory cycles; (iv) normal hormonal profile on day 3 of the cycle (follicle-stimulating hormone, luteinizing hormone, oestradiol); and (v) normal pelvic ultrasonography. All patients had bilateral tubal patency on hysterosalpingography. Hysterosalpingograms were reviewed by the authors before laparoscopy. Semen analyses were normal according to the World Health Organization (WHO) criteria [6]. Patients included in the study had failed to conceive after at least three monitored cycles of ovulation induction with IUI when indicated (negative postcoital test).

This study was approved by the Institutional Review Board, and all patients signed a consent form.

### 2.2. Laparoscopic procedure

Laparoscopies were performed under general anaesthesia. An umbilical 10-mm port and two or three additional 5-mm operating ports were used. Tubal patency was checked with a dye test. Operative findings were recorded in a standardized manner in accordance with the ASRM [2] and Operative Laparoscopy Study Group classifications for adhesions. Endometriosis was confirmed by histology.

Endometriosis was treated with electro-ablation, resection of endometriotic implants and/or ovarian cystectomy. Unilateral or bilateral transient abdominal ovariopexy was performed to prevent adhesion formation or reformation for patients who underwent surgery for severe endometriosis (ASRM Stage III or IV) when this was considered by the surgeon to be indicated. Adhesiolysis was performed within reasonable limits. Tubal surgery involved adhesiolysis, fimbrioplasty and/or neosalpingostomy. After tubal surgery, another dye test was performed. At the end of the procedure, 1000 ml of Adept (icodextrine 4%, Baxter, Maurepas, France) was left in the peritoneal cavity for hydroflotation.

### 2.3. Subsequent fertility assessment

Following surgery, subsequent fertility management was proposed. For patients with normal laparoscopic results, the results of a zona binding test [7] were included in the decision process. Assisted reproductive technology (ART) procedures, such as IVF and/or intracytoplasmic sperm injection, were among the options proposed. Each year, patients were asked about the occurrence of pregnancy, means used to achieve pregnancy and pregnancy outcomes. The final evaluation was undertaken by telephone in November 2010. Data obtained by telephone were matched with those in the patients' medical records. Only first pregnancies were considered.

### 2.4. Statistical analysis

Results are expressed as means and standard deviations. Student's *t*-test, Chi-squared test and log rank test were used for continuous variables, categorical variables and survival analysis, respectively. A *p*-value $<0.05$ was considered to indicate significance.

## 3. Results

### 3.1. Study population

Patients' characteristics and details regarding pre-operative infertility management are shown in Table 1. All hysterosalpingograms were reviewed by the authors; 37 (32.4%) were normal and 77 (67.6%) were subnormal. All patients had bilateral tubal patency (Table 1).

### 3.2. Laparoscopic findings

Abnormal laparoscopies were observed in 95 patients (83.4%), of whom 72, 46 and 18 had endometriosis, pelvic adhesions and tubal pathology, respectively. Details are shown in Table 1. In patients with endometriosis, the mean ASRM score was 13.

**Table 1**
Patients' characteristics and laparoscopic findings.

| Patients ($n=114$) | Mean (±SD) or *n* (%) |
|---|---|
| Age (years) | 32.2 (±4.54) |
| Gravidity | 0.4 (±0.73) |
| 0 | 83 (73) |
| ≥1 | 31 (27) |
| Parity | 0.2 (±0.47) |
| 0 | 98 (86) |
| ≥1 | 16 (14) |
| Type of infertility | |
| Primary | 84 (73.7) |
| Secondary | 30 (26.3) |
| Duration of infertility (months) (min–max) | 40.1 (12–120) |
| Symptoms | |
| Dysmenorrhoea | 53 (46.5) |
| Dyspareunia | 23 (20.2) |
| Chronic pelvic pain | 7 (6.1) |
| Postcoital test | |
| Positive | 44 (38.6) |
| Negative | 70 (61.4) |
| Positive *Chlamydia trachomatis* serology (%) | 9/59 (15.2) |
| Hysterosalpingography | |
| Normal | 37 (32.4) |
| Subnormal | 77 (67.6) |
| Among subnormal hysterosalpingograms | |
| Unilateral retention | 18 (23) |
| Bilateral retention | 52 (68) |
| Unilateral poor peritoneal diffusion | 2 (3) |
| Bilateral poor peritoneal diffusion | 5 (6) |
| Tuba erecta | 3 (4) |
| Intra-uterine abnormality | 8 (10) |
| **Laparoscopic findings** | ***n*** **(%)** |
| Normal pelvis | 19 (16.6) |
| Pelvic disease | 95 (83.4) |
| Endometriosis | 72 (75.8) |
| Mild (Stage I or II[a]) | 51 (70.8) |
| Severe (Stage III or IV[a]) | 21 (29.2) |
| Adhesions | 46 (48.4) |
| Type | |
| Slight | 23 (50) |
| Moderate | 13 (28.3) |
| Severe | 10 (21.7) |
| Localization | |
| Peri-adnexal | 36 (78.3) |
| Other | 20 (43.5) |
| Tubal disease | 18 (18.9) |
| Unilateral | 9 (50) |
| Bilateral | 9 (50) |
| Tubal disease type | |
| Distal phimosis | 11 (40) |
| Proximal tubal occlusion | 8 (30) |
| Fimbrial adhesions | 6 (22) |
| Hydrosalpinx | 2 (7) |
| Tubal patency after surgery | 112 (98.2) |
| Bilateral | 107 (93.9) |
| Unilateral | 5 (4.4) |
| None | 2 (1.7) |

SD, standard deviation.
[a] American Society of Reproductive Medicine classification.
Patients could have several findings on laparoscopy.