

Reproductive outcome after laparoscopic treatment of endometriosis

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Summary

Purpose of investigation: To evaluate the pregnancy rate after laparoscopic treatment of endometriosis.

Patients and methods: 47 infertile women undergoing laparoscopic treatment of endometriosis.

Results: rAFS stage was as follows: 11% of patients had Stage I, 11% Stage II, 53.3% Stage III and 24.4% Stage IV. The mean duration of follow-up was 48.5 ± 18.44 months. The overall pregnancy rate was 64.4%. Eighteen out of 26 women (69%) became pregnant within six months after laparoscopy, 23% at 12 months, 11% within 24 months, and 11% after two years ($p < 0.01$). Adnexal adhesions and tubal status significantly affected the pregnancy rate. No differences were found regarding the stage of disease and the presence of ovarian endometriomas.

Conclusion: Laparoscopic treatment of endometriosis enhances fertility and the pregnancy rate is highest within the first six months after surgery. Adnexal adhesions and tubal conditions influence the reproductive outcome.

Key words: Endometriosis; Laparoscopy; Infertility; Pregnancy rate.

Introduction

Endometriosis affects approximately 5% of women of reproductive age [1]. In infertile women, the prevalence may be as high as 30% [2]. A significant decrease in fecundity has been clearly demonstrated as a result of surgically induced endometriosis in the rat [3]. Most studies have shown that the monthly fecundity of patients with endometriosis is much lower than the fecundity of women without the disease. The cause-effect relationship between endometriosis and infertility remains controversial. The correlation between advanced cases of endometriosis and infertility can be fairly explained by the distorted pelvic anatomy. The causal link between minimal and mild endometriosis and infertility is much debated, as it is the value of resection or ablation of them as a treatment for infertility [4]. Immunological changes occurring within the peritoneal cavity and systemic immunological derangement have been proposed as a factor behind infertility. Oocyte dysfunction may also contribute [5]. Laparoscopy is a widely used diagnostic and therapeutic means of treating endometriosis-associated infertility. The aim of the study was to evaluate the pregnancy rate after laparoscopic treatment of endometriosis.

Materials and methods

Between 1997 and 2002, 47 patients affected by endometriosis and complaining of primary infertility were enrolled in the study. The median age was 30.3 ± 3.99 years (range 19 to 37 years). The duration of infertility was at least two years. No woman had had previous surgery or hormonal medical treat-

ment. All women signed a written informed consent to the study. Before laparoscopy all basic infertility investigations, including semen analysis, postcoital test, hormonal assessment, and ultrasound examinations with follicular monitoring, were performed. In 35 cases ultrasound examination diagnosed the presence of ovarian endometriomas. No other causes of infertility were found in 45 couples. Two patients were excluded from the study due to the presence of male factor infertility. All patients underwent laparoscopy under general anesthesia which confirmed the presence of endometriosis. All laparoscopies were done by the first author. Laparoscopic treatment consisted of peritoneal fluid removal, biopsies and bipolar electrocoagulation of endometriotic implants, excision of the endometriomas by stripping, and adhesiolysis. Specimens were sent for histological confirmation. Chromoperturbation with methylene blue dye was performed in all patients. Tubal surgery was done, if necessary. No postoperative hormonal suppressant therapy with GnRh analogues or oral contraceptives was prescribed. After laparoscopy patients were followed for at least 12 months (mean 48.5 ± 18.44 , range 12-60 months) and the pregnancy rate was evaluated at 6, 12, 24 and after two years. None of the women underwent in vitro fertilization during the period of the study.

Data are expressed as mean values \pm SD and percentages. Data analysis was evaluated for significance using the Student's t-test and Fisher χ^2 test. A p value < 0.05 was considered significant.

Results

Endometriosis was confirmed in all cases. According to the American Fertility Society Classification (r-AFS) [6] the patients were divided as follows: 11% (5/45) of the patients were in Stage I, 11% (5/45) in Stage II, 53.3% (24/45) in Stage III and 24.4% (11/45) in Stage IV. During laparoscopy 22 patients (48.8%) had unilateral ovarian endometriomas, ten in the left ovary, and 12 in

the right one, whilst 13 women (28%) had bilateral endometriotic cysts. The size ranged from 1 to 12 cm (mean: 4.11 ± 2.29 cm). Deep lesions located in the uterosacral ligaments were found in seven (15.5%) patients. All ovarian endometriomas were completely removed by stripping, and deep lesions were excised. Histological examination confirmed the diagnosis. The fallopian tubes appeared normal and adhesion free in 11 (24.4%) patients. Ten patients showed bilateral adhesions involving the tubes, the ovaries and the Douglas pouch, whereas 12 women had unilateral adhesions, which involved 1/3 of the adnexa in 13 women (28.8%), 2/3 in 14 cases (31%), and 3/3 in nine (20%) patients. After adhesiolysis, bilateral tubal patency was found in 43 (95.5%) patients, but 34 (79.6%) women showed an abnormal tubal shape and in three cases fimbrial adhesions. One patient had a unilateral tubal occlusion. Fimbrioplasty was performed in three cases (6.6%). No complications occurred during the procedure or postoperatively and spontaneous pregnancy was achieved in 26 women. The overall pregnancy rate was 64.4%. Fetal losses occurred in two cases (7.6%). Twenty-four patients had a term singleton pregnancy and delivered a healthy baby, among them seven had a second-term pregnancy. The pregnancy rate was 80% in Stage I, 16.6% in Stage II, 58.3% in Stage III and 54.5% in Stage IV (Table 1). No significant difference was observed in pregnancy outcome in different r-AFS stages of endometriosis. No significant difference was found between infertility and the presence or the size of ovarian endometriomas, the presence of deep lesions and the presence of adhesions in the cul de sac. The pregnancy rate was significantly lower when adhesions involving the ovary and the fallopian tube were present, showing a decreasing pattern of pregnancy in parallel with the extent of adhesions ($p < 0.05$). All the patients with normal and patent fallopian tubes had a spontaneous pregnancy, whereas the pregnancy rate was respectively 27% and 36% when one or both tubes showed abnormal morphology ($p < 0.05$). The interval between surgery and conception was six months in 17 patients (65.4%), 12 in six (23%), 24 in three (11.6%) and three (11.6%) after two years. This time-related reduction in pregnancy rate after laparoscopy was significant ($p < 0.01$) (Figure 1).

Discussion

Endometriosis is a common finding in women with infertility, but the mechanism is still controversial. Pre-

Table 1. — Pregnancy rate according to the preoperative stage of disease ($p = NS$).

	Stage I		Stage II		Stage III		Stage IV	
	%	n.	%	n.	%	n.	%	n.
Pregnancy rate	80	4	16	1	58.3	14	54.4	6
	%	n.	%	n.	%	n.	%	n.
	60	6		6	57.1			20

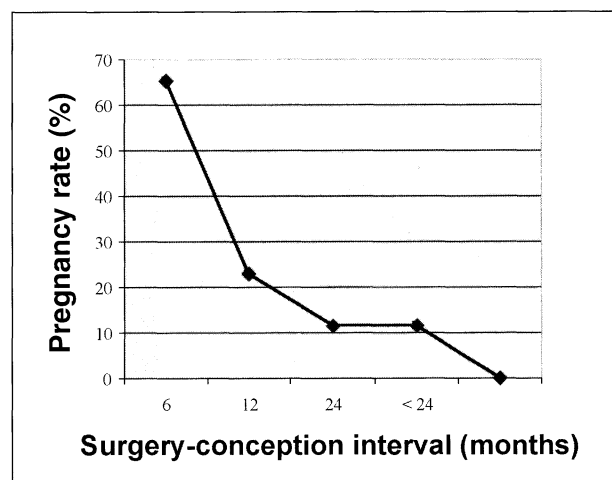


Figure 1. — Cumulative postoperative pregnancy rate. A significant time-dependant diminution of pregnancy rate after laparoscopy can be observed ($p < 0.01$).

vious studies have shown that conservative surgical procedures for endometriosis enhance postoperative fecundity in infertile women with endometriosis [7-9]. Increased fertility has been reported in patients with advanced stages who underwent surgery compared with expectant management [10, 11]. In contrast, the relationship between early stages of endometriosis and infertility remains controversial. Most studies have failed to show an increased pregnancy rate following conservative surgery in early stages endometriosis [12-14]. It has been reported that pregnancy may spontaneously occur in both treated and untreated (expectant) women with minimal and mild endometriosis [10]. However, a prospective randomized study on 341 infertile women with minimal and mild endometriosis showed a higher fecundity rate in the women who had laparoscopic resection or ablation of endometriosis than in the group of expectant management [7]. In our study we treated all endometriotic lesions in all stages because no patient accepted expectant management. The pregnancy rate did not vary by different r-AFS staging, being of 60% in the first two stages and 57.15% in the more advanced stages. Therefore our data seem to confirm the efficacy of laparoscopic ablation of minimal and mild endometriosis. However, the small number of patients in these stages of disease does not allow drawing definite conclusions. Pregnancy outcome was significantly impaired by the increasing adhesive involvement of the ovary and the fallopian tube; this finding may be related to adhesion reformation after surgery or permanent tubal damage. In fact, the presence of altered fallopian tubes significantly affected the fertility of our patients. The presence of deep lesions, peritoneal implants, adhesions in the cul de sac and the size of ovarian endometriomas did not influence the pregnancy rate. Ovarian endometrioma itself does not seem to affect fertility, however, if the ovarian endometrioma causes tight intrapelvic adhesions involving the fallopian tube, the pregnancy rate is significantly diminished. Our data

confirm the significant detrimental effect of adhesions on fertility described in a recent study [15]. Fetal losses occurred in only 8.3% of pregnancies. This result supports the hypothesis that the treatment of endometriosis may reduce the risk of spontaneous abortion in these patients. The postoperative pregnancy rate is highest in the first six months after surgery. This time-dependent diminution of the laparoscopic effect may be related to an incomplete surgery with subsequent progression of lesions left behind, to a *de novo* development of the disease or to adhesion reformation after complete surgery.

Conclusions

In conclusion, our data confirm that laparoscopic surgery in infertile women with endometriosis is effective in increasing their fecundity. The presence of adhesions involving the ovary and the fallopian tube significantly decreases the pregnancy rate of these women. The effect of surgery on fertility is highest within the first six months after treatment.

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