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RESEARCH ARTICLE

Pregnancy Rates and Outcomes after Laparoscopic Surgical Management of Endometriosis: A Retrospective Analytical Study

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ABSTRACT

Objective: The aim of this study was to evaluate the pregnancy rates and outcomes in the patients with endometriosis after laparoscopic surgical management.

Study design: This retrospective analytical study was done in patients diagnosed with endometriosis and who were managed by laparoscopic surgery at our hospital from January 2005 to December 2014. We evaluated pregnancy rates and outcomes in patients with endometriosis after laparoscopic surgical management.

Results: Out of total 140 eligible cases, 84 (60%) patients conceived and 56 (40%) did not conceive. Endometriosis was found to be in the minimal, mild, moderate, and severe stage in 19, 44, 57, and 20 patients respectively. In minimal, mild, moderate, and severe endometriosis, number of patients who conceived were 15 (78.95%), 27 (61.36%), 32 (56.14%), and 10 (50%) respectively. Out of 84 conceived patients, 39 (46.43%) conceived naturally, 25 (29.76%) conceived after controlled ovarian hyperstimulation (COH), intrauterine insemination (IUI), and 20 (23.81%) conceived after *in vitro* fertilization (IVF). There were 54 (64.29%) term pregnancies, 16 (19.05%) preterm pregnancies, and 14 (16.67%) were spontaneous miscarriages in total.

Conclusion: The pregnancy and live birth rates seem to be improved after laparoscopic surgical management of endometriosis. Reproductive outcome was closely associated with stage of endometriosis. A significant inverse correlation was observed between disease severity and spontaneous conception.

Keywords: Endometriosis, Laparoscopy, Pregnancy outcome.

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INTRODUCTION

Endometriosis is classically defined as the presence of endometrial glands and stroma in ectopic locations. It affects 6 to 10% of reproductive-aged women. The prevalence of endometriosis in women experiencing pain, infertility, or both is as high as 50%.[1] The gold standard for diagnosis is by laparoscopy or laparotomy.[2] Both are effective for treatment of endometriosis, as they reduce incidence of implants, relieve dysmenorrhea, pelvic pain, and improve fertility potential.[3-7]

Indeed, endoscopy has been suggested as the approach of choice because of its acknowledged advantages, including minimal trauma, superb visualization, low incidence of complications, reduction of adhesion formation, rapid recovery, and cosmetic effect.[8, 9]

Hence, there was a need for evaluation of pregnancy rates and outcomes in patients with endometriosis after laparoscopic surgical management.

OBJECTIVE

The aim of this study was to evaluate the pregnancy rates and outcomes in the patients with endometriosis after laparoscopic surgical management.

STUDY DESIGN

This retrospective analytical study was done in patients diagnosed with endometriosis who were managed by laparoscopic surgery. It was conducted at our hospital, from January 2005 to December 2014. We evaluated pregnancy rates and outcomes in patients with endometriosis after laparoscopic surgical management.

Inclusion Criteria

- Couples not conceiving after 1 year of unprotected intercourse;
- Women younger than 40 years of age;
- Symptoms (dysmenorrhea, dyspareunia, chronic pelvic pain, abnormal bleeding, or bowel/bladder disturbances) and clinical signs (pelvic tenderness,

retroverted fixed uterus, ovarian enlargement, or tender uterosacral ligaments), suggestive of endometriosis;
- Transvaginal ultrasound findings [ovarian endometrioma(s)/adenomyosis];
- Normal husband semen analysis.

Exclusion Criteria

- Couples presenting with other gynecological pathologies or coexisting causes of infertility besides endometriosis;
- Noncompliant patients;
- Not keen to conceive (including unmarried).

Patient Recruitment

In 227 patients who were operated laparoscopically for endometriosis, 140 patients were eligible for our study. Other patients were excluded from the study (as per exclusion criteria). All eligible participants were followed up and informed about the study in detail after their consent.

In 140 cases, various stages of the endometriosis were identified by direct visualization, in accordance with the revised American Society for Reproductive Medicine classification.

Laparoscopic surgeries were done based on the intraoperative findings as mentioned below. For ovarian endometrioma measuring less than 3 cm, cyst wall fulguration or cystectomy was done. For ovarian endometrioma measuring 3 cm or more in size, cystectomy was done. In ovarian cystectomy, following procedure was done. Injection (dilute) vasopressin was injected into the cyst wall. Incision was taken over the cyst wall. Enucleation of cyst was done. Ovarian reconstruction was done by approximation of ovarian walls by just pressing them with grasper for some time and wherever required by suturing it with poliglecaprone-25 (number 3-0) suture material. Peritoneal implants were excised/fulgurated. Adhesiolysis and anatomical repositioning was done wherever required. Radical excision of endometriotic lesions was done in severe endometriosis.

For most of the patients, biopsy specimens were taken during the surgery and diagnosis was confirmed by histopathological examination.

Then, we followed up the patients to know about the conception, mode of conception, and pregnancy outcome.

Outcomes

Pregnancy rates, mode of conception (natural, COH-IUI or IVF), and pregnancy outcomes (term, preterm, or spontaneous miscarriage) were measured in the patients with endometriosis undergoing laparoscopic surgical management after staging them according to revised American Society for Reproductive Medicine.

Appropriate statistical measurements such as mean, rates, ratios, percentages, proportions, and number were used.

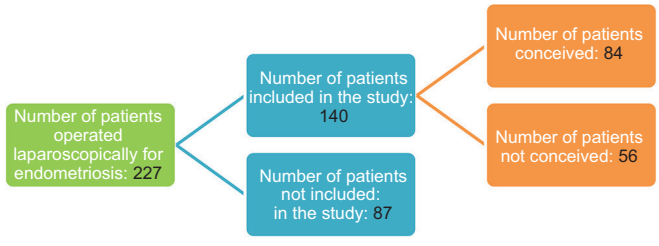
RESULTS

Out of 227 patients operated laparoscopically for endometriosis, 140 were eligible for the study (Flow Chart 1). Eligible patients were divided into four stages of endometriosis based on the revised American Society for Reproductive Medicine classification. Average age of 140 patients was 29.5 years and average married life was 3½ years. Gonadotropin agonist injections were given monthly to 90 patients postoperatively, for 2 or 3 months depending upon the severity.

Endometriosis was found to be of minimal, mild, moderate, and severe stages in 19, 44, 57, and 20 patients respectively. Out of total 140 eligible cases, 84 (60%) patients conceived and 56 (40%) did not conceive (Fig. 1). Number of patients who conceived in minimal, mild, moderate, and severe endometriosis were 15 (78.95%), 27 (61.36%), 32 (56.14%), and 10 (50%) respectively (Table 1 and Graph 1).

In 19 patients with minimal endometriosis, 11 (73.33%) conceived naturally and 4 (26.67%) by controlled ovarian hyperstimulation (COH)-intrauterine insemination (IUI). In 44 patients with mild endometriosis, 15 (55.56%) conceived naturally, 7 (25.93%) by COH-IUI,

Flow Chart 1: Patient recruitment in the study and the results



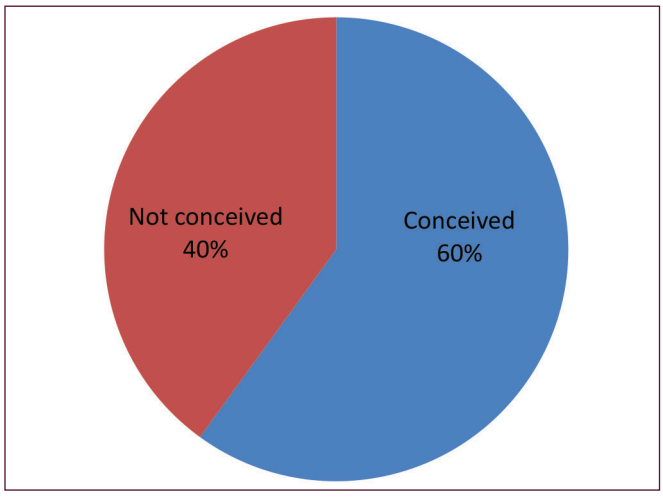
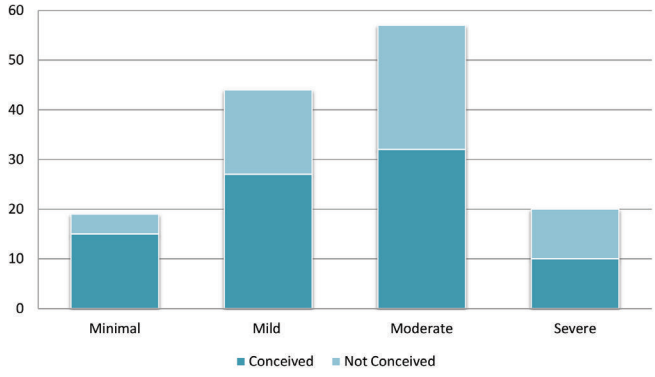


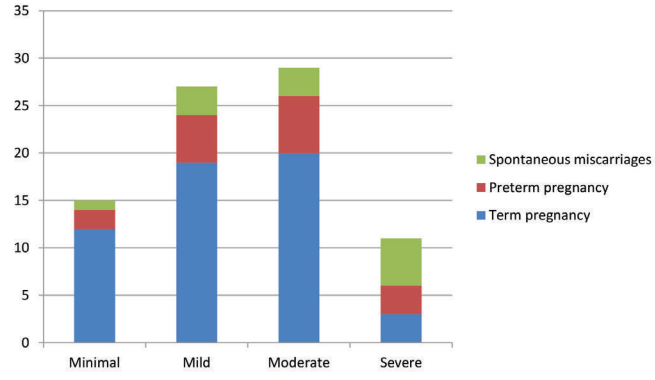
Fig. 1: Conception rate in endometriosis

Table 1: Stage of endometriosis and conception

Conception	*Minimal endometriosis*	*Mild endometriosis*	*Moderate endometriosis*	*Severe endometriosis*	*Total*
Conceived	15	27	32	10	84
Not conceived	4	17	25	10	56
Total	19	44	57	20	140



Graph 1: Number of conception in different stages of endometriosis



Graph 2: Pregnancy outcomes in different stages of endometriosis

and 5 (18.52%) by *in vitro* fertilization (IVF). In 57 patients with moderate endometriosis, 12 (37.5%) conceived naturally, 12 (37.5%) by COH-IUI, and 8 (25%) by IVF. In 20 patients with severe endometriosis, one (10%) conceived naturally, two (20%) by COH-IUI, and 7 (70%) by IVF. Hence in total, 39 (46.43%) conceived naturally, 25 (29.76%) conceived by COH-IUI, and 20 (23.81%) conceived after IVF (Table 2).

In 15 patients who conceived in minimal endometriosis group, 12 (80%) were term pregnancies, 2 (13.33%) were preterm pregnancies, and 1 (6.67%) had spontaneous miscarriage. In 27 patients who conceived in mild endometriosis group, 19 (70.37%) were term pregnancies, 5 (18.52%) were preterm pregnancies, and 3 (11.11%) had spontaneous miscarriages. In 32 patients who conceived in moderate endometriosis group, 20 (62.5%) were term pregnancies, 6 (18.75%) were preterm pregnancies, and 6 (18.75%) had spontaneous miscarriages. In 10 patients who conceived in severe endometriosis group, three (30%) were term pregnancies, three (30%) were preterm pregnancies, and four (40%) had spontaneous miscarriages. Hence, in 84 conceived patients with endometriosis, there were 54 (64.29%) term pregnancies, 16 (19.05%) were preterm pregnancies, and 14 (16.67%) were spontaneous miscarriages (Table 3 and Graph 2).

Table 2: Stage of endometriosis and modes of conception

Mode of conception	*Natural*	*COH-IUI*	*IVF*	*Total*
Minimal endometriosis	11	4	0	15
Mild endometriosis	15	7	5	27
Moderate endometriosis	12	12	8	32
Severe endometriosis	1	2	7	10
Total	39	25	20	84

Table 3: Stage of endometriosis and pregnancy outcomes

Pregnancy outcome	*Term pregnancies*	*Preterm pregnancies*	*Spontaneous miscarriages*	*Total*
Minimal endometriosis	12	2	1	15
Mild endometriosis	19	5	3	27
Moderate endometriosis	20	6	6	32
Severe endometriosis	3	3	4	10
Total	54	16	14	84

DISCUSSION

In our study, out of total 140 eligible cases, 84 (60%) patients conceived and 56 (40%) did not conceive. Endometriosis was found to be in the minimal, mild, moderate, and severe stage in 19, 44, 57, and 20 patients respectively. Number of patients in minimal, mild, moderate, and severe endometriosis who conceived were 15 (78.95%), 27 (61.36%), 32 (56.14%), and 10 (50%) respectively. Out of 84 conceived patients, 39 (46.43 %) conceived naturally, 25 (29.76%) conceived by COH-IUI, and 20 (23.81%) conceived after IVF. There were 54 (64.29%) term pregnancies, 16 (19.05%) were preterm pregnancies, and 14 (16.67%) were spontaneous miscarriages. The conception rates and pregnancy outcomes were better in our study than other study mentioned below.

Endometriosis has the lowest likelihood of fertility among infertile patients,[10,11] with the odds of fecundity in untreated women with endometriosis ranging from 0.02% to 0.1%.[12] This is enhanced after laparoscopic treatment from 30 to 37% at 2 years[13,14] to 60% at 3 years.[15]

Moreover, as expected, a significant inverse correlation was observed between disease severity and spontaneous

pregnancy. The data on surgical treatment of advanced endometriosis with the aim of pregnancy are inconclusive. In cases of ovarian endometrioma-associated infertility, surgery must be considered as the first-line treatment, whatever the subsequent proposed technique. Patients should be advised to begin attempting to conceive naturally soon after laparoscopy. When pregnancy does not occur naturally, they should move on to COH-IUI, later on to IVF.[16]

Laparoscopic surgery for excision or ablation of mild endometriosis almost doubles the spontaneous pregnancy rate based on prospective randomized controlled trials. In women with moderate to severe endometriosis, operative laparoscopy increases the spontaneous pregnancy rates based on controlled trials. Excision of ovarian endometriomas larger than 4 cm increases the pregnancy rate and decreases the recurrence rate. The antral follicle count is not significantly affected after excision of endometriomas. *In vitro* fertilization is the best option for patients after failed primary surgery.[17]

In a similar retrospective analytical study by Cirpan et al, 23 (44%) pregnancies were obtained in 52 patients, resulting in 16 term pregnancies, four spontaneous miscarriages under 16 weeks gestation, two spontaneous miscarriages at 20 weeks, and 1 ectopic pregnancy. The pregnancy rate was 57% in stages I to II, 47% in stage III, and 16% in stage IV endometriosis (according to American Fertility Society).[18]

According to another study, the correct management of infertile women with endometriosis is a combination of surgery and in absence of a spontaneous postsurgery pregnancy, IVF-ET (embryo transfer). This integrated approach (surgery-IVF-ET) produced a pregnancy rate of 56.1% compared with a significantly lower pregnancy rate of only 37.4% after surgery alone.[19] High success rates in pain reduction, quality of life, sexual activity, and cumulative rates have been reported when surgery was carried out in conjunction with multidisciplinary approaches.[20]

CONCLUSION

The pregnancy and live birth rates seem to be improved after laparoscopic surgical management of endometriosis. Reproductive outcome was closely associated with stage of endometriosis. A significant inverse correlation was observed between disease severity and spontaneous conception.

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