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**Original Research Article**

# Fertility outcomes following laparoscopic management of endometriosis: a prospective study from a tertiary fertility centre

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## ABSTRACT

**Background:** Endometriosis is a common gynecological disorder affecting approximately 10–15% of reproductive-aged women and is strongly associated with infertility and pelvic pain. Laparoscopic surgery plays an important role in the diagnosis and management of endometriosis. This study aimed to evaluate fertility outcomes following laparoscopic management of endometriosis.
**Methods:** This prospective study was conducted at Sudha Sundar Fertility Hospital, Tamil Nadu between January 2018 and August 2022. A total of 53 women diagnosed with endometriosis who underwent laparoscopic surgery were included. Procedures included laparoscopic cystectomy, adhesiolysis, and fulguration of endometriotic lesions. Patients were followed up for fertility outcomes.
**Results:** Most patients belonged to the age group of 31–35 years (43.3%). Primary infertility was present in 86.7% of patients. Advanced disease (stage III–IV) was observed in the majority of cases. The overall pregnancy rate following laparoscopic treatment was 45.29%.
**Conclusions:** Laparoscopic management of endometriosis improves fertility potential and assists in planning further assisted reproductive techniques when required.

**Keywords:** Endometriosis, Infertility, Laparoscopy, Pregnancy outcome, Endometriotic cystectomy

## INTRODUCTION

Endometriosis is a chronic, estrogen-dependent gynecological disorder characterized by the presence of endometrial glands and stroma outside the uterine cavity. It affects approximately 10–15% of women of reproductive age and is one of the leading causes of infertility and chronic pelvic pain.[1] The prevalence of endometriosis is significantly higher among infertile women, affecting nearly 30–50% of this population.[2]

The pathophysiology of infertility in endometriosis is multifactorial and involves anatomical distortion due to adhesions, altered tubo-ovarian relationships, inflammatory changes in the peritoneal environment, impaired oocyte quality, and reduced endometrial receptivity.[3] These mechanisms collectively contribute to reduced fecundity and increased difficulty in achieving spontaneous conception.

Laparoscopy remains the gold standard for both diagnosis and management of endometriosis. It allows direct visualization of pelvic pathology and enables simultaneous surgical intervention, including adhesiolysis, cystectomy, and ablation of endometriotic lesions.[4] Several studies have demonstrated that laparoscopic treatment can improve fertility outcomes by restoring pelvic anatomy and reducing inflammatory mediators that interfere with fertilization and implantation.[5]

However, despite advances in surgical techniques and assisted reproductive technologies, the impact of

laparoscopic management on fertility outcomes remains variable and depends on factors such as disease severity, patient age, and ovarian reserve.[6] Furthermore, data from Indian populations regarding long-term fertility outcomes following laparoscopic management of endometriosis remain limited.

Therefore, the present study aims to evaluate fertility outcomes following laparoscopic management of endometriosis in infertile women treated at a tertiary fertility centre.

## METHODS

This was a prospective observational study conducted at Sudha Sundar Fertility Hospital, Putheri, Kanyakumari District, Tamil Nadu, India, from January 2018 to August 2022.

### *Selection criteria*

*Inclusion criteria*

Women diagnosed with endometriosis-associated infertility who underwent laparoscopic surgical management during the study period were included.

*Exclusion criteria*

Patients with other causes of infertility such as male factor infertility, endocrine disorders, uterine anomalies, or those who did not complete follow-up were excluded from the study.

### *Study procedure*

All patients underwent detailed clinical evaluation including history and physical examination. Baseline investigations including hormonal profile and ultrasound were performed.

Diagnostic laparoscopy was carried out under general anesthesia. Tubal patency was assessed using chromopertubation. Based on intraoperative findings, the following procedures were performed: laparoscopic cystectomy for ovarian endometriomas, fulguration or ablation of superficial endometriotic lesions, and adhesiolysis to restore normal pelvic anatomy.

The severity of endometriosis was staged intraoperatively according to the revised American Society for Reproductive Medicine (rASRM) classification.

### *Follow-up*

Patients were followed up for a period of 1 to 5 years to assess fertility outcomes including spontaneous conception, ovulation induction, intrauterine insemination (IUI), and *in vitro* fertilization (IVF).

### *Statistical analysis*

Data were analyzed using descriptive statistical methods. Results were expressed as frequencies and percentages. Continuous variables were summarized as mean±standard deviation where applicable.

## RESULTS

Age distribution is shown in Table 1. The majority of patients belonged to the 31–35 years age group (43.3%), followed by 26–30 years (37.7%), indicating that endometriosis-associated infertility was most common in women in their early thirties.

**Table 1: Age distribution among study population.**

| Age group (years) | Number | Percentage |
|---|---|---|
| **20–25** | 5 | 9.5 |
| **26–30** | 20 | 37.7 |
| **31–35** | 23 | 43.3 |
| **36–40** | 5 | 9.5 |

Clinical symptoms are summarized in Table 2. Dysmenorrhea was the most common symptom (98.1%), followed by dyspareunia (51%), highlighting the symptomatic burden of the disease.

**Table 2: Clinical symptoms.**

| Variable | Number | Percentage |
|---|---|---|
| **Dysmenorrhea** | 52 | 98.1 |
| **Dyspareunia** | 27 | 51 |

Type of infertility is shown in Table 3. Primary infertility constituted 86.7% of cases, suggesting that endometriosis is a significant contributing factor in women presenting with primary infertility.

**Table 3: Type of infertility.**

| Type | Number | Percentage |
|---|---|---|
| **Primary infertility** | 46 | 86.7 |
| **Secondary infertility** | 7 | 13.3 |

Ovarian reserve markers are shown in Table 4. A majority of patients had low AMH levels (66%), indicating reduced ovarian reserve in women with endometriosis.

**Table 4: Ovarian reserve markers.**

| Parameter | Finding | Percentage |
|---|---|---|
| **Low AMH** | 35 | 66 |
| **Normal AMH** | 14 | 26 |
| **High AMH** | 4 | 8 |

Severity of endometriosis is shown in Table 5. Most patients had advanced stage disease (stage III–IV, 88.7%), suggesting delayed diagnosis and presentation.

**Table 5: Severity of endometriosis on laparoscopy.**

| Stage | Number | Percentage |
|---|---|---|
| **Stage II** | 6 | 11.3 |
| **Stage III** | 23 | 43.4 |
| **Stage IV** | 24 | 45.3 |

Mode of conception after laparoscopic treatment is shown in Table 6. IVF was the most common method of conception (22.6%), while spontaneous conception occurred in 16.9% of patients.

**Table 6: Mode of conception after laparoscopic treatment.**

| Method | Number | Percentage |
|---|---|---|
| **Spontaneous conception** | 9 | 16.9 |
| **Ovulation induction** | 1 | 1.9 |
| **IUI** | 2 | 3.77 |
| **IVF** | 12 | 22.6 |

Delivery outcomes are shown in Table 7. The majority of patients delivered by caesarean section (78.95%), with fewer normal vaginal deliveries.

**Table 7: Delivery outcomes.**

| Outcome | Number | Percentage |
|---|---|---|
| **Normal vaginal delivery** | 4 | 21.05 |
| **Caesarean section** | 15 | 78.95 |

Overall, the pregnancy rate following laparoscopic management was 45.29%, indicating a significant improvement in fertility outcomes.

## DISCUSSION

The present study evaluated fertility outcomes following laparoscopic management of endometriosis in infertile women treated at a tertiary fertility centre. Endometriosis is a well-recognized cause of infertility due to its effects on pelvic anatomy, ovarian function, and the peritoneal inflammatory environment.

Most patients in this study belonged to the reproductive age group of 26–35 years, which is consistent with previous studies reporting that endometriosis predominantly affects women during their reproductive years.[6]

In our study, primary infertility constituted the majority of cases (86.7%). This observation differs from some earlier studies where secondary infertility was more common. The difference may be attributed to referral bias as the present study was conducted in a tertiary fertility centre where most patients present primarily for infertility evaluation.[7]

The majority of patients in this study had advanced stage disease (stage III–IV). Advanced endometriosis is commonly associated with pelvic adhesions, ovarian endometriomas, and distortion of tubo-ovarian anatomy which significantly affect fertility.[8] The overall pregnancy rate following laparoscopic treatment in our study was 45.29%. These findings are comparable to several published studies demonstrating improved fertility outcomes following laparoscopic surgery for endometriosis.[9]

Marcoux and his research team reported significantly improved pregnancy rates following laparoscopic ablation of endometriotic lesions in infertile women.[10] Surgical removal of endometriotic implants helps restore pelvic anatomy and reduce inflammatory mediators that impair fertilization and implantation.[11]

However, a proportion of patients still required assisted reproductive techniques such as in vitro fertilization, particularly in advanced disease or diminished ovarian reserve.[12] Therefore individualized fertility management based on patient age, ovarian reserve, and disease severity is essential.[13]

### *Strengths*

The present study was conducted in a tertiary fertility centre with dedicated facilities for laparoscopic management of endometriosis and assisted reproductive techniques. All procedures were performed by an experienced laparoscopic surgeon which ensured uniformity in surgical technique. In addition, patients were followed up for a relatively long period of up to five years which enabled evaluation of long-term fertility outcomes.

### *Limitations*

The study had certain limitations including a relatively small sample size and single-centre design. Larger multicentric studies with longer follow-up periods may help further validate these findings.

## CONCLUSION

Laparoscopic surgery remains an effective diagnostic and therapeutic modality for the management of endometriosis-associated infertility. The procedure allows assessment of disease severity while simultaneously restoring pelvic anatomy through adhesiolysis, cystectomy, and ablation of endometriotic lesions. Laparoscopic management may improve fertility outcomes either through spontaneous conception or by facilitating assisted reproductive techniques such as intrauterine insemination and *in vitro* fertilization.

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