

## Pain and Fertility Outcomes in Patients Undergoing Cyst Excision Versus Cyst Aspiration in Moderate to Severe Endometriosis: A Case Series

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### KEYWORDS

Endometriosis, Ovarian cysts, Cyst excision, Cyst aspiration, Infertility, India

### ABSTRACT

**Background:** Endometriosis and ovarian cysts are prevalent gynecological disorders characterized by the presence of abnormal tissue growth in the pelvic cavity.

**Objective:** To document the pain and fertility outcomes in patients undergoing cyst excision versus cyst aspiration in moderate to severe endometriosis presenting to a tertiary healthcare facility.

**Methods:** This was a case series conducted in the Department of Obstetrics and Gynecology, Vinayaka Missions Medical College & Hospital, Vinayaka Missions Research Foundation (VMRF, Deemed to be University), Karaikal, Puducherry, India between June 2021 and May 2023 (n=14).

**Results:** The study included 14 patients, divided evenly with 7 undergoing cyst excision and 7 undergoing cyst aspiration. Before surgery, both groups had comparable baseline characteristics in terms of age, symptom severity, and the nature of the ovarian cysts. After surgery, patients who underwent cyst excision showed a higher rate of pain relief compared to those who underwent cyst aspiration (61% versus 26%, respectively). In terms of fertility outcomes, 55% of patients in the cyst excision group achieved improved clinical pregnancy outcomes after surgery, whereas 35% of those in the cyst aspiration group had comparable results.

**Conclusion:** Cyst excision appears to be associated with superior pain relief and faster recovery compared to cyst aspiration in patients with endometriosis or ovarian cysts.

## 1. Introduction

Endometriosis is a chronic illness that impacts millions of women globally (10% of women of reproductive age), marked by the growth of tissue similar to the lining inside the uterus but located outside it.(1) This condition can cause intense pelvic pain, infertility, and other serious complications, greatly diminishing a woman's quality of life.(2, 3) Although endometriosis has no cure, various treatments are available to manage symptoms and enhance fertility. Among these, laparoscopic excision surgery has become notably significant.(4)

Laparoscopic excision surgery, often referred to as minimally invasive surgery, entails removing endometrial implants and adhesions through small abdominal incisions using specialized tools.(5) This surgical method allows for a comprehensive examination of the pelvic area, providing a conclusive diagnosis of endometriosis. Surgeons can directly observe the extent of the disease, pinpoint the locations of endometrial implants, and evaluate related complications such as ovarian cysts or adhesions. This precise diagnostic capability is vital for crafting a personalized treatment plan suited to the patient's specific needs. Unlike other treatments like hormonal therapy, which mainly aim to manage symptoms, laparoscopic excision offers a more focused approach by removing endometrial tissue directly.(6) By excising the lesions thoroughly, surgeons aim to eliminate the pain source and reduce the likelihood of the disease returning.(7) This focused treatment has demonstrated long-term symptom relief and improved the quality of life for many women with endometriosis.

A major concern for women with endometriosis is the impact on fertility. Laparoscopic excision surgery helps preserve fertility by removing endometrial implants and restoring the normal pelvic structure.(8) By addressing structural issues such as blocked fallopian tubes or distorted pelvic anatomy, this surgical method can enhance the chances of natural conception for women seeking to become pregnant.(9) Laparoscopic excision is

conducted using minimally invasive techniques, involving smaller incisions compared to traditional open surgery. This results in less postoperative pain, decreased blood loss, shorter hospital stays, and quicker recovery times for patients. Additionally, the smaller incisions lead to minimal scarring, improving the aesthetic results and patient satisfaction.(10, 11)

Against this background, the objective of this case report was to document the pain and fertility outcomes in patients undergoing cyst excision versus cyst aspiration in moderate to severe endometriosis presenting to a tertiary healthcare facility.

## **2. Methodology**

This was a case series conducted in the Department of Obstetrics and Gynecology, Vinayaka Missions Medical College & Hospital, Vinayaka Missions Research Foundation (VMRF, Deemed to be University), Karaikal, Puducherry, India (a teaching tertiary healthcare facility) between June 2021 and May 2023. The study was approved by the Institutional Human Ethics Committee (IHEC). The Participant Information Sheet (PIS) was translated into the local language (Tamil) and given to the participants (and their attendants). The information was also verbally explained to them in their native language until they fully understood it. Participants were included in the study after they provided written informed consent. Medical records of 14 women diagnosed with endometriosis, aged 21 to 38 years, were retrospectively reviewed. Diagnosis was primarily with imaging modalities including transvaginal ultrasound (n=14) and magnetic resonance imaging (MRI; n=14) utilized for lesion characterization.

The collected data included sociodemographic characteristics, clinical/preoperative symptoms, diagnostic methods (e.g., laparoscopy, imaging studies), treatment interventions (e.g., medical therapy, surgical excision), and postoperative outcomes. Regular serial assessments were conducted to evaluate disease progression, response to treatment, recurrence, and complications. Pain outcomes were evaluated using validated visual analogue scale (VAS),(12) cyst recurrence was confirmed through imaging studies, and fertility outcomes were assessed based on subsequent conception rates or assisted reproductive techniques.(13)

A comprehensive medical history was obtained from both partners, focusing on the duration of infertility, menstrual history, previous surgeries, and coexisting medical conditions. Systemic examinations, including pelvic examinations, were conducted to assess for pelvic tenderness, masses, and anatomical abnormalities suggestive of endometriosis.(14) Male factor infertility was ruled out in all cases. Ultrasound of the abdomen and pelvis, a valuable tool for visualizing pelvic structures and identifying endometriomas, ovarian morphology, and associated pathologies such as renal calculi, was performed in all female patients. Excluding other abdominal pathologies, including renal calculi, helped confirm that the observed findings were primarily related to endometriosis.

## **3. Case Series**

The study cohort consisted of 14 women with a mean age of 29 years (range: 21-38 years) at the time of initial diagnosis. The most common presenting symptom was pelvic pain (n=14, 100%), followed by dysmenorrhea (n=10, 71.4%) and infertility (n=10, 78.9%). In MRI examinations, the majority of these patients exhibited characteristics of deep pelvic endometriosis, including obliterated uterosacral ligaments, unilateral or bilateral endometriomas measuring 5 centimeters or larger, and one or both ovaries adhering to the uterus, with or without the presence of pararectal nodules and unilateral or bilateral hematosalpinx. Several patients displayed signs of severe adhesions between pelvic organs, such as the colon, fallopian tubes, and the posterior wall of the uterus, which are typical in advanced endometriosis. Pararectal nodules were also observed, indicating endometriotic involvement in the rectovaginal septum. Severe deep pelvic endometriosis with extensive adhesions and nodules is associated with significant pain and infertility. Diagnostic laparoscopy confirmed endometriosis in all patients, with lesions varying in stage and anatomical location. Throughout the 2-year follow-up period, patients received a combination of medical therapies (e.g., hormonal agents, nonsteroidal anti-inflammatory drugs).

Surgical intervention was the primary treatment modality, with laparoscopic excision of endometriotic lesions or cyst aspiration was performed in all cases. Hormonal therapy was initiated postoperatively to suppress disease recurrence. The presence of unilateral or bilateral endometriomas measuring more than or equal to 4 cm in size, along with kissing ovaries (both ovaries are close together due to adhesions), is a significant finding indicative of advanced endometriosis were noted in all of our cases. Of the 14 patients, seven underwent laparoscopic cyst excision with or without unilateral or bilateral salpingectomy depending on tubal status, along with or without

adhesiolysis (Group A), and seven other patients underwent cyst aspiration (Group B).

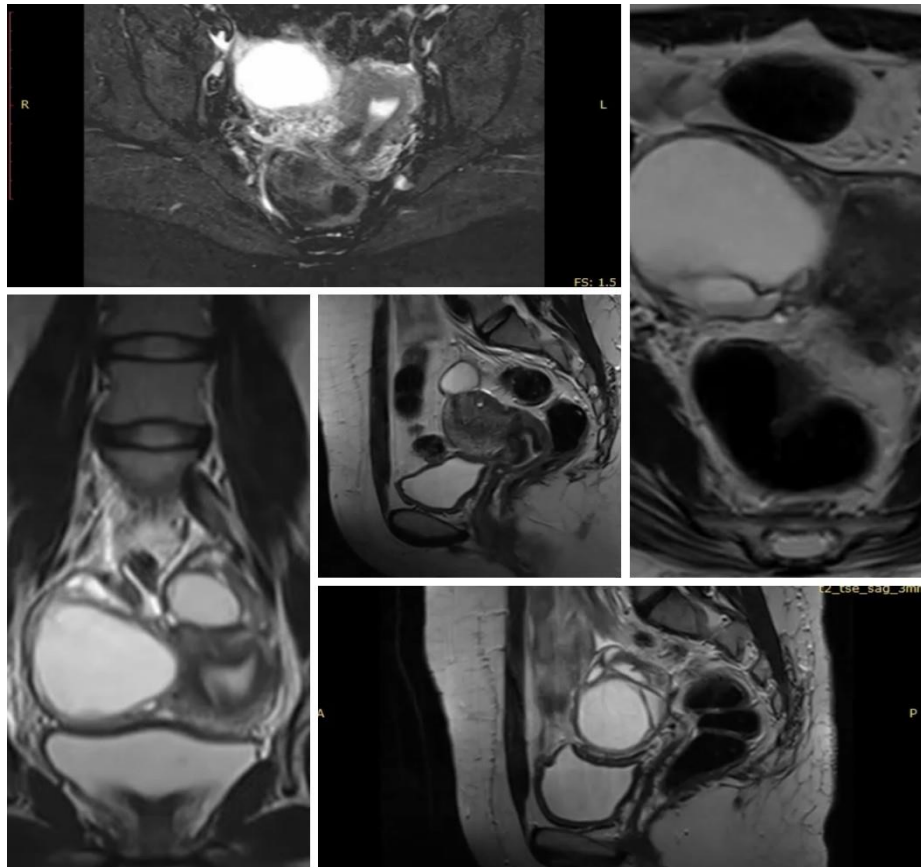


Figure 1: Magnetic Resonance Imaging

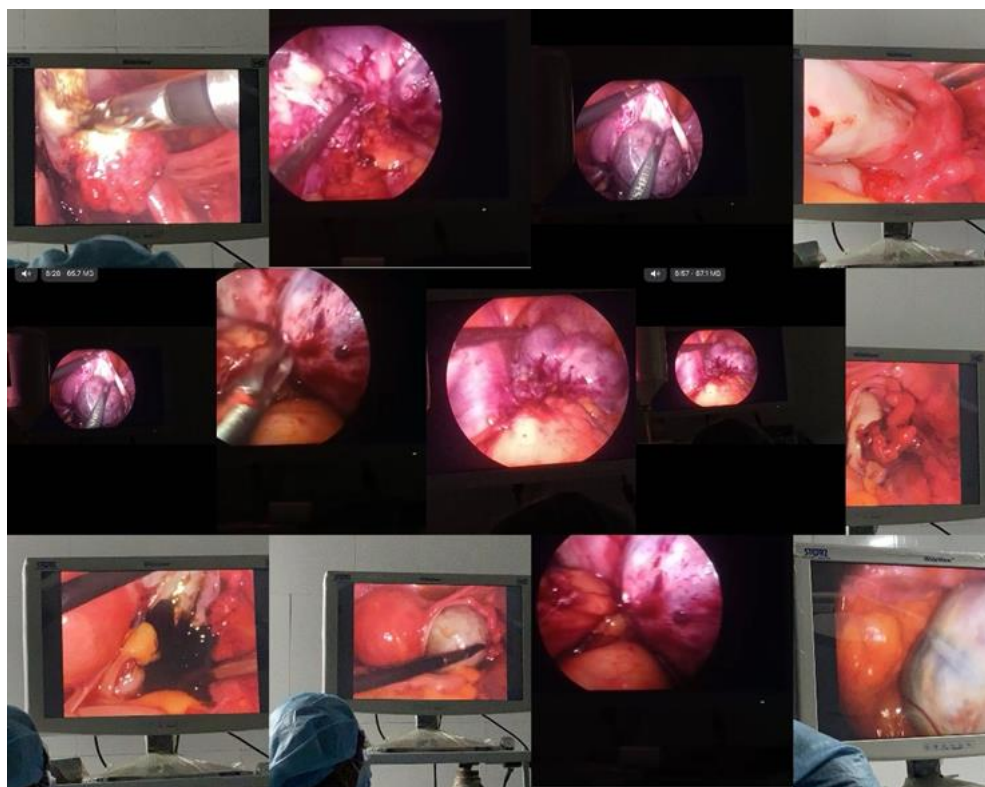


Figure 2: Intraoperative images

**Table 1: Comparison of outcomes, by cystectomy vs cyst aspiration**

Outcome Measure	Cystectomy Group	Cyst Aspiration Group
Symptom Relief	Higher rates of symptom relief	Lower rates of symptom relief
Recurrence of Symptoms	Lower recurrence rates	Higher recurrence rates
Fertility Improvement	Improved fertility outcomes	Limited improvement in fertility
Pregnancy Rates	Higher pregnancy rates	Lower pregnancy rates
Complications	Higher risk of complications	Lower risk of complications
Adhesion Formation	Lower risk of adhesion formation	Higher risk of adhesion formation
Surgical Time	Longer surgical time	Shorter surgical time
Hospital Stay	Longer hospital stay	Shorter hospital stay

Subfertile patients desiring to conceive were planned for fertility treatment between 3 to 18 months post-surgery. Post-surgery, all patients were administered GnRH analog injections of leuprolide 3.75 mg as monthly depots for 3 months. Anti-Müllerian Hormone (AMH) and Antral Follicle Count (AFC) were measured postoperatively and compared with preoperative values. Additionally, these patients exhibited mildly to moderately elevated levels of follicle-stimulating hormone (FSH) and luteinizing hormone (LH), indicating diminished ovarian reserve. Patients who underwent cystectomy with bilateral tubal sterilization were thoroughly counseled and referred to higher centers for IVF, recognizing IVF-ICSI as the primary option for conception in these cases. These patients were followed up for the next 1.5 years through phone calls to the patients and by obtaining permission from the concerned hospitals for further management updates. All patients received agonist protocols using GnRH agonist injections of leuprolide. All patients were induced with injections of HMG 300 to 450 units combined with Growth Hormone 4-8 IU. Follicles were serially monitored with serum E2 on alternate days. When more than three dominant follicles (>18mm) appeared and E2 levels did not exceed 4000 pg/mL, follicles were ruptured with HCG 10000 IU. Oocytes were retrieved after 48 hours, and ICSI was performed in all patients. Following ICSI, all patients were given 2-3 doses of GnRH agonist injections of leuprolide monthly depot. After complete suppression, patients were planned for Frozen Embryo Transfer, preceded by endometrial receptivity assessment using oral and injectable estradiol for endometrial thickening over 10 days. Two patients with thin endometrium underwent an endometrial receptivity assay. The remaining patients were monitored for a cycle by thickening the endometrium with 6 mg of estradiol per day for 10-13 days, followed by injectable and oral progesterones for 6 days. Embryos were thawed and transferred by day 6 of progesterone administration. Post-transfer, patients were advised to maintain normal activities with adequate rest, proper diet, and to avoid strenuous activities or exercise. Serum beta hCG levels were measured using quantitative hCG testing with immunometric assays.

The VAS scores ranged from 0 to 4, indicating a significant reduction in pain among all patients, although a few exhibited recurrent unilateral or bilateral cysts. Of the seven patients who underwent cyst excision, three experienced cyst recurrence with sizes less than 3 cm. In contrast, of the seven patients who underwent only cyst aspiration, six experienced cyst recurrence with sizes ranging from 3 cm to 6 cm. After three months, all 14 patients were reassessed for pain severity, quality of life, and symptom improvement. It was noted that patients who had complete cyst excision experienced better symptomatic relief compared to those who had cyst aspiration.

For the subsequent three months, patients were monitored without any gonadotropin analogs and reassessed after an additional two months.<sup>(15)</sup> Four out of seven patients who underwent complete cyst excision presented with recurrent cysts sized between 2-4 cm but had significantly reduced pain scores of less than three. All patients who underwent cyst aspiration experienced recurrent cysts; two had cysts smaller than 4 cm, while the rest had cysts larger than 4 cm, with all presenting pain and dyspareunia with VAS scores of 6 or higher. Anti-Müllerian Hormone (AMH) levels, often tested to assess ovarian reserve, showed a reduction in all patients, correlating with Antral Follicle Count (AFC) in 80% of cases. Additionally, these patients had mildly to moderately elevated levels of follicle-stimulating hormone (FSH) and luteinizing hormone (LH), indicating



diminished ovarian reserve.

Patients who underwent cystectomy with bilateral tubal sterilization received thorough counseling and were referred to higher centers for IVF, recognizing IVF-ICSI as the primary option for conception. Patients with a history of failed IVF retrieved more M2 oocytes, leading to better-quality embryos, with most developing into Day 5 blastocysts that were subsequently frozen.(16) Seventy-five percent of these patients had an adequate number of embryos with improved oocyte quality. Thirty-five percent of patients tested positive for pregnancy within three months post-surgery, 25% within one year, and 30% tested negative up to 18 months post-surgery. Ten percent refrained after two failed IVF cycles. Patients with one or both patent tubes underwent ovulation induction and IUI. Ten percent conceived through ovulation induction within three months, 5% through IUI (3-4 cycles) within 6-8 months, 20% refrained during the treatment course, and 65% failed to conceive through ovulation induction or IUI even after 18 months post-surgery. The reported pregnancy rates were cumulative and not per cycle, with a mean time to achieve pregnancy post-surgery of  $11.8 \pm 12.1$  months. Patients who underwent cyst aspiration were similarly planned for fertility treatment based on tubal status. AMH and antral follicle counts were checked prior to treatment and were found to be lower than in cystectomy patients, though not as significantly low.

Patients were monitored and followed up for a period of two years. Evaluations revealed significant symptom improvement, with six patients reporting reduced pelvic pain and five experiencing resolution of dysmenorrhea. Two patients conceived spontaneously during the follow-up period. The surgical complications were minimal, with no major intraoperative or postoperative complications observed during the follow-up period.

#### **4. Discussion**

This case series emphasizes the multifaceted nature of endometriosis, which presents significant challenges in both symptom management and infertility treatment. Endometriosis often involves a complex interplay of factors that require a comprehensive and individualized approach. Effective management must address not only the physical symptoms but also the associated reproductive issues, necessitating a holistic and patient-specific treatment strategy.(17, 18) The research indicates that the quantity and quality of oocytes and embryos are generally better in most patients, regardless of whether they underwent surgical interventions like cystectomy or other procedures.(19) Despite this overall improvement, there was no substantial difference between the groups, suggesting that cystectomy and similar surgeries may enhance general fertility outcomes without significantly impacting the specific metrics of oocyte and embryo quality during IVF.(20) This finding implies that while surgical interventions might improve some aspects of fertility, they do not necessarily translate to better IVF results in terms of oocyte and embryo retrieval.

When comparing cystectomy to cyst aspiration, the study suggests that cystectomy may provide better pain relief but could also lead to a more significant reduction in ovarian reserve. This highlights the need to carefully evaluate the risks and benefits of each surgical option.(21) Patients and clinicians must consider the potential trade-offs between achieving pain relief and preserving ovarian function, which is crucial for fertility. This comparison underscores the importance of personalized treatment plans that balance these competing factors to optimize patient outcomes.(22)

IVF appears to offer superior fertility outcomes for patients with endometriosis-related infertility compared to other methods such as ovulation induction or intrauterine insemination (IUI).(23) However, the study notes that the impact of surgical interventions like cystectomy on IVF outcomes remains unclear and warrants further investigation. Determining the exact role of these surgical procedures in improving IVF success rates is essential for refining treatment protocols and ensuring that patients receive the most effective therapies for their specific conditions.(24) The absence of a significant difference in IVF outcomes between patients undergoing different surgical interventions highlights a critical need for more evidence-based studies. Further research is necessary to clarify whether laparoscopic cystectomy before IVF offers additional fertility benefits compared to other treatment strategies.(25) This research should aim to establish clearer guidelines and inform clinical decision-making, ultimately improving the management of endometriosis-related infertility. Effective management of endometriosis-related infertility often requires a multidisciplinary approach involving gynecologists, reproductive endocrinologists, and fertility specialists.(26) This collaborative effort ensures that treatment plans are tailored to individual patient needs and are based on the latest evidence and best practices. Such an approach is crucial for optimizing fertility outcomes and addressing the complex nature of endometriosis.(27) By integrating expertise from various medical disciplines, healthcare providers can offer more comprehensive and

effective care for patients struggling with endometriosis-related infertility. To summarize, while IVF appears to be more effective than ovulation induction or IUI for patients with endometriosis-related infertility, the precise impact of surgical interventions like cystectomy on IVF outcomes needs further exploration through evidence-based studies.(28) Collaborative efforts among healthcare providers and researchers are essential for advancing our understanding and improving the management of endometriosis-related infertility. This integrated approach is key to addressing the complexities of endometriosis and enhancing patient care and outcomes.

## 5. Conclusion

Conservative laparoscopic surgery stands as a fundamental approach in treating endometriosis, providing a customized method for alleviating symptoms and preserving fertility. By carefully excising lesions and performing adhesiolysis, this minimally invasive technique is crucial for reducing pelvic pain, dysmenorrhea, and dyspareunia, while also improving fertility prospects. This case series highlights the essential role of conservative laparoscopic surgery in enhancing clinical outcomes and the quality of life for women with endometriosis. Additional prospective studies with larger sample sizes and extended follow-up periods are necessary to confirm these results and clarify the long-term effectiveness of conservative surgical treatments for endometriosis.

Cyst excision is linked to better pain relief and quicker recovery compared to cyst aspiration in patients with endometriosis or ovarian cysts. While both procedures have similar effects on fertility outcomes, the decision between cyst excision and cyst aspiration should consider individual patient factors, lesion specifics, and surgical objectives. More prospective studies are required to substantiate these findings and inform clinical decision-making in the treatment of endometriosis and ovarian cysts.

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