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**Original Research Article**

# Comparative analysis of surgical versus medical management in alleviating pain in endometriosis patients

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## ABSTRACT

**Background:** Endometriosis is a prevalent gynecological disorder associated with chronic pelvic pain and infertility. Management typically involves surgical or medical interventions. Aim of this study was to compare the effectiveness of these approaches in alleviating pain and improving fertility outcomes.
**Methods:** This comparative study was conducted with patients who received treatment at the department of obstetrics and gynecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from February 2022 to January 2023. Seventy-six women with endometriosis were randomly assigned to either the surgical group (n=38) or the medical group (n=38). Pain relief, recurrence rates, side effects, and fertility outcomes were assessed over 12 months.
**Results:** The surgical group showed significantly greater pain relief, with 78.9% achieving ≥50% pain reduction compared to 47.4% in the medical group (p=0.003). Recurrence of pain was lower in the surgical group (21.1%) compared to the medical group (52.6%) (p=0.003). Surgical complications occurred in 7.9% of patients, while 36.8% of the medical group experienced hormonal side effects. Regarding fertility, 50.0% of patients in the surgical group achieved pregnancy, compared to 31.3% in the medical group, though this difference was not statistically significant (p=0.262).
**Conclusions:** Surgical management of endometriosis provides more effective and sustained pain relief and lower recurrence rates compared to medical management.

**Keywords:** Endometriosis, Fertility, Medical therapy, Pain management, Surgery

## INTRODUCTION

Endometriosis is a chronic gynecological condition characterized by the presence of endometrial tissue outside the uterus, primarily on the pelvic ovaries, peritoneum, and rectovaginal septum.[1] This ectopic tissue responds to hormonal cycles like the normal endometrium, leading to chronic inflammation, scarring, adhesions, and significant symptoms such as pelvic pain, dysmenorrhea, dyspareunia, and infertility.[2] The condition affects around 10% of women of reproductive age worldwide and up to 50% of infertile women.[3]

The pathogenesis of endometriosis is complex and not fully understood, though the most widely accepted theory is retrograde menstruation, where menstrual blood flows backward through the fallopian tubes into the pelvic cavity, allowing endometrial cells to implant and grow outside the uterus.[4] However, this theory does not explain all cases, suggesting that immune dysfunction, genetic predisposition, and environmental factors may also contribute.[5,6]

Pain management is a critical aspect of treating endometriosis, as the condition often causes severe and

chronic pain. This pain is believed to result from inflammation, irritation of pelvic nerves, and adhesions that distort pelvic anatomy.[7] Treatment strategies aim to alleviate pain, improve fertility, and prevent disease progression, with options broadly categorized into medical and surgical approaches.[8]

Medical management involves hormonal therapies designed to suppress ovarian function and menstruation, thereby reducing the growth and activity of endometriotic lesions.[9] Common treatments include oral contraceptives, GnRH agonists, progestins, and aromatase inhibitors.[10] While these therapies can be effective in reducing pain and slowing disease progression, their effects are often temporary, with symptoms frequently recurring after discontinuation.[11] Additionally, long-term use of certain hormonal therapies, such as GnRH agonists, can lead to side effects like decreasing bone density, necessitating careful patient selection and monitoring.[12]

Surgical management, typically via laparoscopy, aims to remove or destroy endometriotic lesions.[13] Laparoscopic excision or ablation is considered the gold standard for diagnosing and treating endometriosis, providing more definitive and long-lasting pain relief, especially in cases where medical therapy has failed or when anatomical distortions or adhesions contribute to pain.[14] However, the risk of recurrence remains, with studies reporting recurrence rates of 20% to 40% within five years.[15]

Choosing between medical and surgical management depends on factors such as symptom severity, patient age, reproductive goals, disease extent, and treatment history.[16] Some patients may benefit from a combination of both approaches, with surgery followed by medical therapy to suppress residual disease and prevent recurrence.[17] However, the long-term effectiveness of these strategies in providing pain relief and improving quality of life is still debated.[18]

Given the chronic nature of endometriosis and the potential for recurrence, a multidisciplinary approach involving gynecologists, pain specialists, and mental health professionals is often recommended for comprehensive care.[19] Recent advances in minimally invasive surgical techniques and new hormonal therapies offer hope for more effective management of this challenging condition.[20] However, further research is needed to optimize treatment protocols and identify the best management strategies for individual patients.[6]

### *Aim*

This study aimed to contribute to this ongoing discussion by comparing the effectiveness of surgical versus medical management in alleviating pain. By evaluating pain relief outcomes, recurrence rates, and associated complications, this research seeks to provide evidence that may guide clinical decision-making and improve patient care.

## METHODS

This comparative study was conducted with patients who received treatment at the department of obstetrics and gynecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from February 2022 to January 2023. A total of 76 patients diagnosed with endometriosis were included in the study. The inclusion criteria were women aged 18-45 years with a confirmed diagnosis of endometriosis based on clinical symptoms, imaging, and/or laparoscopy. Patients were excluded if they had other pelvic pathologies, were pregnant, or had undergone previous surgical treatment for endometriosis. The patients were divided into two groups: those who received surgical management (n=38) and those who received medical management (n=38). Surgical management involved both laparotomy and laparoscopic excision or ablation of endometriotic lesions, while medical management included hormonal therapy with oral contraceptives, GnRH analogs, or progestins. Pain assessment was conducted using the visual analog scale (VAS) at baseline, 6 months, and 12 months post-treatment. Additionally, the quality of life was assessed using the endometriosis health profile-30 (EHP-30) at the same intervals. Data were collected through structured interviews and medical records. Statistical analysis was performed using SPSS version 25.0, with the chi-square test used for categorical variables and the t-test for continuous variables. A p value of $<0.05$ was considered statistically significant. Ethical approval was obtained from the institutional review board of BSMMU, and informed consent was obtained from all participants before enrolment. Confidentiality and anonymity were maintained throughout the study. The primary outcome was the reduction in pain levels and improvement in quality of life, comparing the effectiveness of surgical versus medical management. Secondary outcomes included the incidence of treatment-related complications and recurrence of symptoms. The results were used to provide evidence-based recommendations for the optimal management of endometriosis-related pain.

## RESULTS

Table 1 presents the baseline characteristics of the 76 study participants, divided equally into the surgical and medical groups (38 participants each). The average age in the surgical group was 32.4 years (SD±6.1), while in the medical group, it was 31.8 years (SD±5.9), with no significant difference between the groups (p=0.625). The body mass index (BMI) was also comparable between the groups, with the surgical group having an average BMI of 24.6 kg/m$^2$ (SD±3.4) and the medical group 24.9 kg/m$^2$ (SD±3.2), showing no significant difference (p=0.712). The duration of symptoms, severity of pain measured by the visual analog scale (VAS), history of infertility, and the percentage of participants who had undergone previous treatments were all similar between the groups, with p values of 0.762, 0.553, 0.640, and 0.646, respectively.

**Table 1: Baseline characteristics of study participants (n=76).**

| Characteristic | Surgical group (n=38) | Medical group (n=38) | P value |
|---|---|---|---|
| **Age (years, mean±SD)** | 32.4±6.1 | 31.8±5.9 | 0.625 |
| **BMI (kg/m², mean±SD)** | 24.6±3.4 | 24.9±3.2 | 0.712 |
| **Duration of Symptoms (years)** | 5.3±2.4 | 5.1±2.7 | 0.762 |
| **Severity of Pain (VAS, mean±SD)** | 7.8±1.2 | 7.6±1.3 | 0.553 |
| **History of infertility (%)** | 18 (47.4) | 16 (42.1) | 0.640 |
| **Previous treatments (%)** | 22 (57.9) | 20 (52.6) | 0.646 |

**Table 2: Marital status of our study participants (n=76).**

| Marital status | Surgical group (n=38) (%) | Medical group (n=38) (%) | Total (n=76) (%) |
|---|---|---|---|
| **Single** | 10 (26.3) | 8 (21.1) | 18 (23.7) |
| **Married** | 22 (57.9) | 23 (60.5) | 45 (59.2) |
| **Divorced** | 4 (10.5) | 4 (10.5) | 8 (10.5) |
| **Widow** | 2 (5.3) | 3 (7.9) | 5 (6.6) |

**Table 3: Pain relief outcomes at 6 months and 12 months (n=76).**

| Time point | Surgical group (n=38) | Medical group (n=38) | P value |
|---|---|---|---|
| **VAS score at 6 months (mean±SD)** | 3.2±1.5 | 4.6±1.8 | 0.004 |
| **VAS score at 12 months (mean±SD)** | 2.8±1.4 | 5.2±2.0 | <0.001 |
| **% with significant pain relief (≥50% reduction) at 12 months** | 30 (78.9) | 18 (47.4) | 0.003 |

**Table 4: Recurrence rates and side effects (n=76).**

| Outcome | Surgical group (n=38) | Medical group (n=38) | P value |
|---|---|---|---|
| **Recurrence of pain (%)** | 8 (21.1) | 20 (52.6) | 0.003 |
| **Surgical complications (%)** | 3 (7.9) | N/A | N/A |
| **Hormonal side effects (%)** | N/A | 14 (36.8) | N/A |

**Table 5: Fertility outcomes (for patients desiring pregnancy) (n=34).**

| Outcome | Surgical group (n=18) | Medical group (n=16) | P value |
|---|---|---|---|
| **Achieved pregnancy (%)** | 9 (50.0) | 5 (31.3) | 0.262 |
| **Time to conception (months, mean±SD)** | 9.2±3.1 | 11.4±3.6 | 0.127 |

Table 2 shows the number and percentage of participants in each marital status category: single, married, divorced, and widow. For the surgical group, 26.3% were single, 57.9% married, 10.5% divorced, and 5.3% widow. In the medical group, 21.1% were single, 60.5% married, 10.5% divorced, and 7.9% widow.

Table 3 summarizes the pain relief outcomes at 6 and 12 months for the study participants. At 6 months, the mean visual analog scale (VAS) score in the surgical group was 3.2 (SD±1.5), significantly lower than the 4.6 (SD±1.8) observed in the medical group (p=0.004). This trend continued at 12 months, where the surgical group reported a further reduced mean VAS score of 2.8 (SD±1.4), compared to 5.2 (SD±2.0) in the medical group, with the difference being highly significant (p<0.001). Additionally, a significantly higher percentage of participants in the surgical group (78.9%) experienced a substantial pain reduction (≥50% reduction in VAS score) at 12 months, compared to 47.4% in the medical group (p=0.003).

Table 4 presents the recurrence rates and side effects observed in the surgical and medical groups. The recurrence of pain was significantly lower in the surgical group, with 21.1% of participants experiencing pain recurrence, compared to 52.6% in the medical group (p=0.003). Surgical complications were reported in 7.9% of the surgical group participants, while no surgical complications were applicable in the medical group. Conversely, hormonal side effects were reported by 36.8% of participants in the medical group, which was not applicable to the surgical group.

Table 5 summarizes the fertility outcomes for patients desiring pregnancy in the surgical and medical groups. In

the surgical group, 50.0% of participants achieved pregnancy, compared to 31.3% in the medical group, though the difference was not statistically significant (p=0.262). The average time to conception was slightly shorter in the surgical group (9.2±3.1 months) than in the medical group (11.4±3.6 months), but this difference also did not reach statistical significance (p=0.127).

## DISCUSSION

Endometriosis, a chronic gynecological condition, is associated with significant pain, infertility, and reduced quality of life. The management of endometriosis typically involves surgical or medical approaches, each with distinct advantages and drawbacks.

Pain relief is a primary treatment goal for endometriosis. In this study, the surgical group exhibited significantly greater pain reduction compared to the medical group. At 12 months, 78.9% of patients in the surgical group reported a significant reduction in pain (≥50% reduction in VAS score) versus 47.4% in the medical group (p=0.003). These findings align with prior research, which generally supports the superiority of surgical management for sustained pain relief. A systematic review by Abbott et al., demonstrated that laparoscopic excision of endometriotic lesions resulted in a 65% reduction in pain at 6 months, and 50% at 12 months, compared to a 33% reduction in the hormonal therapy group.[21] Similarly, Sutton et al., reported that 65% of women undergoing laparoscopic excision experienced significant pain relief at 12 months compared to 42% in the medical group.[22] This suggests that while medical therapy, such as GnRH agonists, is effective during treatment, pain recurrence is common after cessation, unlike in surgical treatment where pain relief tends to be more durable.

The recurrence of pain is a major concern in endometriosis management. In this study, the recurrence rate in the surgical group was 21.1% compared to 52.6% in the medical group (p=0.003). Higher recurrence rates with medical management are well-documented. For instance, Vercellini et al, reported that pain recurred in 45% of patients treated medically within 12 months, compared to only 15% in those treated surgically.[23] This difference is primarily due to the temporary nature of symptom suppression with medical therapy, which does not remove the lesions but only reduces their activity. Another study, the ENZIAN study in 2020, showed a 30% recurrence rate in patients undergoing surgical management compared to 60% in those receiving medical treatment.[24] These findings suggest that surgical intervention offers more enduring relief from pain, likely due to the physical removal of endometriotic tissue, which medical therapy does not achieve.

Although surgery provides significant benefits, it is associated with risks. In this study, 7.9% of patients in the surgical group experienced complications such as infections or bleeding. Chapron et al, reported a similar complication rate of 6-8% for laparoscopic excision, with bowel injury and bleeding being the most common issues.[25] These risks underscore the importance of skilled surgical technique and careful patient selection. In contrast, medical management avoids surgical risks but often comes with significant side effects. In this study, 36.8% of patients in the medical group reported side effects like weight gain and mood swings. Surrey and Hornstein et al, found that 35-40% of women on GnRH agonists experienced adverse effects, particularly concerning bone mineral density loss.[26] This limits the long-term use of hormonal therapy and often necessitates a return to surgery or alternative medical treatments when side effects become intolerable.

Fertility is a crucial consideration for many women with endometriosis. In this study, 50% of the surgical group achieved pregnancy compared to 31.3% in the medical group, though the difference was not statistically significant (p=0.262). Nevertheless, the trend suggests that surgery might enhance fertility outcomes, as supported by other studies. Barnhart et al, conducted a meta-analysis showing that surgical treatment of endometriosis increased pregnancy rates by 35% compared to no treatment or medical therapy.[27] Similarly, Marcoux et al, found that laparoscopic excision improved pregnancy rates by 30-50% compared to hormonal treatment.[28] Surgery not only removes lesions but also restores pelvic anatomy, potentially increasing the likelihood of conception. However, the potential risks to fertility from surgery should not be overlooked. Somigliana et al., highlighted that ovarian surgery could reduce ovarian reserve, especially in cases involving bilateral endometriomas.[29] This risk necessitates a careful evaluation of the benefits versus risks of surgery in women seeking to preserve fertility.

Given the chronic and heterogeneous nature of endometriosis, treatment often requires a multidisciplinary approach involving gynecologists, pain specialists, and reproductive endocrinologists. An individualized treatment plan should be developed based on symptom severity, fertility desires, and previous treatment responses. For instance, a woman with severe pain but no immediate plans for pregnancy might benefit from surgery followed by medical therapy to prevent recurrence. Conversely, a woman seeking to conceive may prioritize surgical intervention with careful postoperative monitoring to protect ovarian function.

This study has some limitations. The study included 76 participants, which may limit the generalizability of the findings. A larger sample size could provide more robust data and increase the reliability of the results. The study's follow-up period of 12 months may not be sufficient to fully assess long-term outcomes and recurrence rates. Extended follow-up is needed to evaluate the durability of treatment effects and the long-term safety of both surgical and medical approaches.

## CONCLUSION

The management of endometriosis is complex, requiring a personalized approach. This study, along with existing literature, supports the conclusion that surgical management offers superior long-term pain relief, lower recurrence rates, and potentially better fertility outcomes compared to medical therapy. However, the risks associated with surgery, particularly regarding fertility, and the significant side effects of medical therapy, must be carefully weighed. The choice between surgical and medical management should be guided by a thorough discussion of the benefits and risks of each approach, aligned with the patient's individual goals and circumstances. Further research is needed to develop treatment strategies that offer sustained relief without significant adverse effects.

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