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Evidence based surgical management of endometriosis

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Abstract The management approach to patients with pelvic endometriosis is multidimensional. One must consider several factors such as patient's age, parity, extent of the disease, and menopausal status when planning treatment strategies. The main goals of therapy are targeted at symptom control and achieving fertility in women who so desire. Medical and/or surgical therapies can be considered in these patients. Individualized patient care is essential for the success of treatment. In this review, we focus our discussion on surgical approach strategies and the management of endometriosis with an emphasis on pain and fertility outcomes.

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1. Introduction

Endometriosis is a complex disease primarily affecting a woman in her reproductive years of life. The spectrum of signs and symptoms that women with endometriosis suffer can vary from mild dysmenorrhea to debilitating pelvic pain and/or infertility. Although a definitive diagnosis can only be made

histologically at the time of surgery, evidence of endometriosis from a woman's clinical history may lead to treating symptoms empirically with medical therapy. Women who suffer from much severe disease, fail medical therapy, or desire fertility may benefit from surgery.

The following review highlights the various surgical approaches for the treatment of endometriosis, including conservative procedures, definitive interventions, and adjunct surgical treatments. A list of the surgical approaches to endometriosis is represented in Table 1. Medical treatment for endometriosis and the use of assisted reproductive techniques (ART) for endometriosis-related infertility were discussed in "Evidence-based long-term management of endometriosis: Medical therapy and treatment of infertility," in the previous issue.

2. Management goals

Endometriosis has several unique biological properties. It behaves as a chronic and recurrent disease because of microscopic implants that continue to be active after surgical treatment. Many patients have quiescent disease with rare

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Table 1 Surgical treatment options for endometriosis.

- Laparoscopy with surgical excision of lesions
- Laparotomy with surgical excision of lesions
- Hysterectomy with ovarian conservation
- Hysterectomy with removal of ovaries

Adapted from Bedaiwy and Liu Pathophysiology, diagnosis, and surgical management of endometriosis: A chronic disease, SRM, Vol. 8, No. 3/August 2010.

episodes of pain, while others have frequent, recurrent pain. Symptoms often do not correlate with lesion size or extent of disease. Current approaches for managing endometriosis are aimed mainly at treating symptoms of pain and infertility, while targeting disease progression and preventing recurrence.

Management goals can differ among patients. For young patients with mild disease not desiring children, it is advisable to use medical suppression to control symptoms and minimize surgical intervention. For women with severe disease who desire fertility, surgery followed by ART is a reasonable option. Lastly, the management of surgically menopausal patients with symptomatic endometriosis requires a different approach, in which the off-label use of new medical therapies, such as aromatase inhibitors, may be considered.

3. Surgical treatment for endometriosis

Surgical intervention can be an initial step in the diagnosis and treatment of endometriosis. In general, local excision of endometriosis is associated with good short-term outcomes but, a high reoperative rate (1,2). In contrast, hysterectomy with conservation of the ovary is associated with a low reoperation rate (2). The indications for surgical management are shown in Table 2.

4. Conservative surgery

The major objectives of conservative surgery are to ablate or excise all visible endometriotic lesions, preserve the uterus and ovarian tissue, and restore normal pelvic anatomy. In conservative operations, implants are either ablated (vaporized or coagulated) or excised, endometriomas are removed, and adhesions are lysed. Appendectomy may be performed concurrently if indicated. Multiple small studies have found no difference in pregnancy rates following an electrocoagulation ablation for the removal of endometriosis lesions.

Surgical management for ovarian endometriomas greater than 3 cm in diameter has been shown to reduce symptoms of pain. A systematic review concluded that excision of the cyst wall is better than drainage and cauterization of the cyst wall

for relief of dysmenorrhea, dyspareunia, and nonmenstrual pelvic pain (3). Although the authors concluded that fertility-related outcomes were improved with the excision of endometriomas, concerns that excessive resection of ovarian tissue can compromise fertility still exist.

A minimally invasive approach is associated with a shorter hospital stay and decreased recovery time. Laparotomy may be necessary for advanced disease with extensive adhesions or involvement of uterine arteries, ureter, bladder, and bowel (4). Laparoscopy has been shown to be as effective as laparotomy in the treatment of ovarian endometriomas. Recently, robotically-assisted laparoscopic surgical series have been reported. There are no studies demonstrating that one surgical energy modality (electrosurgical, laser, ultrasonic, or robotic) is superior to another.

4.1. Pain outcome

The effectiveness of surgical treatment of endometriosis in treating pain was best shown in two small, prospective randomized controlled trials. In the first trial, Sutton and co-workers found that laser laparoscopy resulted in significant pain relief 6 months postoperatively compared with expectant management (5). This study concluded that operative laparoscopy is an effective treatment for alleviating pain symptoms in women with stages I, II, and III endometriosis, although less benefit was observed for minimal disease. The majority of patients whose pain was initially relieved by surgery remained pain-free 1 year later (1). These findings were substantiated by another well-designed prospective randomized trial in which the laparoscopic excision of implants led to symptomatic improvement in 80% of patients at 6 months compared with 32% of controls (6).

4.2. Fertility outcome

Randomized trials to assess surgical treatment and fertility are limited. A trial in Canada randomized 341 patients to either diagnostic laparoscopy only or laparoscopy with lesion ablation showed significant improvement in the time to pregnancy with surgical treatment (7). The number of laparoscopies needed to achieve an extra pregnancy was 9 (95% confidence interval [CI], 5–33). A second, smaller randomized trial conducted in Italy did not show differences between surgery and expectant management (8). A meta-analysis of these two randomized clinical trials showed a clear beneficial effect on fertility (9). Unfortunately, no randomized trials have been performed to evaluate the subsequent fertility of patients with advanced endometriosis. In all, surgical management of fertility secondary to endometriosis appears to improve pregnancy rates, however, to what extent is uncertain (10).

Table 2 Indications for the surgical management of endometriosis.

- Severe incapacitating pain symptoms with significant functional impairment
- Severe and advanced disease with significant anatomic impairment (distortion of pelvic organs and/or endometriomas)
- Failure of expectant or medical management
- Noncompliance with or intolerance to medical treatment
- Endometriosis emergencies: Rupture or torsion of endometrioma, obstructive uropathy, or bowel obstruction

Adapted from Bedaiwy and Liu Pathophysiology, diagnosis, and surgical management of endometriosis: A chronic disease, SRM, Vol. 8, No. 3/August 2010.

Table 3 Recommendations for the surgical management of endometriosis.^a

- Although surgical management for infertility due to endometriosis can improve pregnancy rates, the overall magnitude of effect is unknown
- Excision of an endometrioma is the preferred surgical technique over simple drainage or cauterization of the cyst wall
- A hysterectomy with ovarian conservation in a woman with normal ovaries can be considered for definitive treatment
- Surgical management of endometriosis is appropriate in women who have failed medical therapy and desire future fertility

^a Adapted from Management of Endometriosis. Practice Bulletin No. 113. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2010;116:223–36.

5. Definitive surgical interventions

The only definitive treatment for endometriosis is total abdominal hysterectomy, bilateral salpingo-oophorectomy with the removal of all visible endometriosis. This is usually performed in women with advanced disease who have completed childbearing or in women with intractable pain unresponsive to more conservative treatments (11). Preservation of ovaries can be associated with a recurrence rate of 30%, with the increased risk of a second operation either to remove the ovaries or to treat recurrent endometriosis. In a retrospective study with 7 years of follow-up, the local excision of endometriosis was associated with good short-term outcomes, but long-term follow-up demonstrated a high reoperation rate (2). Conversely, hysterectomy was associated with a low reoperation rate. Removal of the ovaries did not significantly improve the surgery-free interval. According to the recommendations of the American College of Obstetricians and Gynecologists (ACOG), women with normal ovaries can undergo hysterectomy with ovarian conservation and the removal of any endometriotic lesions for the definitive treatment of endometriosis (10). A complete list of surgical recommendations by ACOG is outlined in Table 3.

Removal of both ovaries may be necessary in perimenopausal patients or when the ovaries are extensively damaged by the disease. Hormone therapy should be discussed with the patient when the ovaries are removed (12). Most clinicians will consider the use of combined estrogen and progestin therapy. The possible beneficial effect of progestins should be balanced against the risk of breast cancer and the risk of recurrent disease (13).

6. Adjunct surgical interventions

Presacral neurectomy and laparoscopic uterosacral nerve ablation (LUNA) have been performed for intractable endometriosis-associated chronic pelvic pain. Presacral neurectomy has only been shown to improve midline pain and has been associated with bowel and bladder postoperative side effects. A recent Cochrane review showed that there is insufficient evidence to recommend the use of LUNA in the management of dysmenorrhea, regardless of the cause (14). A randomized trial in the United Kingdom showed that among women with chronic pelvic pain, LUNA did not result in improvements in pain, dysmenorrhea, dyspareunia, or the quality of life compared with laparoscopy without pelvic denervation (5). Due to these reasons, both procedures have fallen out of favor as adjunct therapy for endometriosis.

7. Combined medical and surgical approaches

Medical and surgical therapies are often combined to treat advanced endometriosis. However, the advantages of either

preoperative or postoperative medical therapy are debated. It is postulated that preoperative medical therapy facilitates the subsequent operative procedure. A Cochrane review found that hormonal suppression prior to surgery decreases the size of endometriotic implants, thereby reducing the extent of surgery required (15).

Postoperative medical suppressive therapy has been shown to be effective in decreasing endometriosis recurrence. This is especially the case if it is used for long periods of time (16). Typically, however, postoperative medical therapy is used for a short period (6 months). Symptom recurrence is not usually seen while patients are receiving medical therapy. In a Cochrane review of postsurgical hormonal suppression compared with surgery alone, postoperative medical treatment decreased recurrence rates, but no benefit was observed for the outcomes of pain or pregnancy rates (15).

When comparing different postoperative treatment options, another Cochrane review showed that postoperative placement of a levonorgestrel-releasing intrauterine device (LNG-IUD) resulted in a greater reduction in the recurrence of dysmenorrhea than the administration of a gonadotropin-releasing hormone (GnRH) agonist, although this has not been a widely adopted treatment (17).

8. Summary

For most women, symptom relief is the key treatment objective when managing endometriosis. While a large number of medical therapies are available, surgery may be warranted for patients who fail medical treatment, develop acute complications, or experience significant medication side effects. Conservative or definitive surgical interventions can be considered based on the patient's age, extent of the disease, reproductive goals, treatment risks, side effects, and cost considerations. Current evidence is insufficient, however, to recommend adjunct surgical procedures involving presacral neurectomy or LUNA. Postoperative medical therapy is advised following the incomplete removal of endometriotic implants to increase the duration of pain relief and delay symptom recurrence.

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