

Laparoscopic Excision of Endometrioma

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INTRODUCTION

Endometriosis can have a significant impact on the sufferer, the gynecologist and the health care system. For the sufferer, quality of life may be significantly decreased.²⁴ For the gynecologist it constitutes a considerable workload, accounting for 10–15% of new referrals.²⁴ For the surgeon, the diagnosis and treatment of endometriosis accounts for 25–35% of laparoscopies and 10–15% of hysterectomies each year.²⁵ Finally for the health care system, endometriosis imposes considerable costs; direct costs of surgical therapy are estimated at US\$5805 and for medical treatments US\$2418.²⁶ The indirect costs of time away from employment, the burden of pain and its impact on quality of life are also recognized. Surgical treatment of endometriosis may be effective in relieving dysmenorrhea, dyspareunia, non-menstrual pelvic pain and dyschesia.^{24,27} It is most common in the pelvic cavity, including the ovaries, the uterosacral ligaments, and pouch of Douglas. Common symptoms include dysmenorrhea, dyspareunia, non-cyclic pelvic pain, and subfertility. The clinical presentation is variable, with some women experiencing several severe symptoms and others having no symptoms at all. The prevalence in women without symptoms is 2-50%, depending on the diagnostic criteria used and the populations studied. The incidence is 40-60% in women with dysmenorrhea and 20-30% in women with subfertility.¹⁻³ The severity of symptoms and the probability of diagnosis increase with age.⁴ The most common age of diagnosis is reported as around 40, although this figure came from a study in a cohort of women attending a family planning clinic.⁵ Symptoms and laparoscopic appearance do not always correlate. The American Society for Reproductive Medicine has published a classification of severity of endometriosis at laparoscopy.

Several factors are thought to be involved in the development of endometriosis. Retrograde menstruation remains the dominant theory for the development of pelvic endometriosis, though as this is almost universal it is unlikely to be the sole explanation.⁷⁻⁹ The quantity and quality of endometrial cells, failure of immunological mechanisms, angiogenesis, and the production of antibodies against endometrial cells may also have a role.^{10,11} Embryonic cells may

give rise to deposits in distant sites such as the umbilicus, the pleural cavity, and even the brain.^{8,9}

Risk factors generally relate to exposure to menstruation: early menarche and late menopause increase the risk whereas the use of oral contraceptives reduces.⁵

What is the natural course of endometriosis?

Studying the natural course is difficult because of the need for repeat laparoscopy. Two studies in which laparoscopy was repeated after treatment in women given placebo, however, reported that over 6-12 months, endometrial deposits resolved spontaneously in up to a third of women, deteriorated in nearly half, and were unchanged in the remainder.^{12,13}

Diagnosis of Endometriosis

What Features of History and Examination are Important?

In women of reproductive age who present with recurrent dysmenorrhea or pelvic pain you should take a full history of reproduction and carry out a pelvic examination. The cyclical nature of the pain and the relation of the pain to menstruation points to the diagnosis of endometriosis. Painful micturition, defecation, and dyspareunia are also associated. In young women you should consider other diagnoses such as pelvic infection, problems in early pregnancy, ectopic pregnancy, ovarian cyst torsion, and appendicitis (Table 1). During pelvic examination, tenderness in the posterior fornix or adnexa, nodules in the posterior fornix, or adnexal masses may indicate endometriosis. Adolescents presenting with dysmenorrhea do not require a pelvic examination as disease is uncommon.

Transvaginal ultrasonography can reliably detect endometriomata (cysts of endometriosis), but failure to reveal cystic structures does not exclude the diagnosis of endometriosis.^{3,14} Magnetic resonance imaging is increasingly used to identify subperitoneal deposits, although retroversion, endometriomata, and bowel structures may mask small nodules.^{4,15} Although concentrations of the cancer antigen CA125 are slightly raised in some women with endometriosis, the test neither excludes nor diagnoses endometriosis and is not considered useful in establishing the diagnosis.⁵ The threshold for surgery is unlikely to be influenced by the CA125

concentration, and the guidelines from the Royal College of Obstetricians and Gynecologists described CA125 as having only limited value as either a screening or a diagnostic test.⁶

Laparoscopy is the only diagnostic test that can reliably rule out endometriosis. It is also accurate in detecting endometriosis and is considered the standard investigation.⁶

What are the Indications for Laparoscopy?

Many young women experience dysmenorrhea (about 60-70%), and unless there are other features to indicate endometriosis laparoscopy is not recommended.¹⁶ Some women will require further investigation to guide management. For adolescents who present with dysmenorrhea, the recommended approach is to first prescribe non-steroidal anti-inflammatory drugs (NSAIDs) and oral contraceptives.^{17,18} The lack of measurable pain relief with these drugs is usually an indication for further investigation.¹⁹ Other indications for laparoscopy include severe pain over several months, pain requiring systemic therapy, pain resulting in days off work or school, or pain requiring admission to hospital.

Treatment options for medical therapy include oral contraceptives, progestogens, androgenic agents, and gonadotrophin releasing hormone (GnRH) analogues. All suppress ovarian activity and menses and atrophy of endometriotic implants, although the extent to which they achieve this varies. There have been few randomised controlled trials of medical treatment versus placebo, although many trials have compared different types of medical treatment.⁷⁻¹⁰ All medical treatments are similarly effective in relieving pain during treatment.

The side effect profiles are important in deciding treatment choices. Progestogens are associated with irregular menstrual bleeding, weight gain, mood swings, and decreased libido. The side effects associated with danazol include skin changes, weight gain, and occasionally deepening of the voice, and it is infrequently prescribed now. GnRH analogues dramatically lower estrogen concentrations, and side effects include the development of menopausal symptoms and the loss of bone mineral density with long-term use (both reversible). Estrogen therapy in an add back regimen is useful for preventing side effects with GnRH analogues.¹⁰ In the randomised controlled trials comparing subcutaneous depot medroxyprogesterone acetate (SC-DMPA) with GnRH analogues the bone loss was less with the progesterone during treatment.²⁰⁻²¹ Recurrence of painful symptoms after six months of medical treatment may be as high as 50% in the 12-24 months after the treatment is stopped.²²⁻²³ Recurrence may in part be because large lesions respond poorly to medical treatment. It is generally accepted that endometriomata are not amenable to medical treatment, although temporary clinical relief may be achieved.

The levonorgestrel intrauterine system (LNG-IUS) is an established treatment for heavy menstrual bleeding but can also be used for dysmenorrhea and endometriosis.^{11,24} In one

study only 10% of women who had a levonorgestrel intrauterine system after surgery for endometriosis had moderate or severe dysmenorrhea compared with 45% of the women who had surgery only.¹² In a trial of 82 women with endometriosis the levonorgestrel intrauterine system had similar effectiveness to GnRH analogues, but the potential for long-term use of this system is advantageous if the woman does not want to conceive.¹³ It has also been used in women with rectovaginal disease.¹⁴ In the future aromatase inhibitors may have a therapeutic role in endometriosis as they inhibit estrogen production selectively in endometriotic lesions, without affecting ovarian function.²⁵

Is Surgery or Medical Treatment More Effective?

There are no randomised controlled trials comparing medical versus surgical treatments for the management of endometriosis, and the decision about medical or surgical treatment at the time of diagnosis will depend on several factors including patient's choice, the availability of laparoscopic surgery, the desire for fertility, and concerns about long-term medical therapy.

Surgery for endometriosis can be performed laparoscopically or as an open procedure. It entails excision or ablation (by laser or diathermy), or both, of the endometriotic tissue with or without adhesiolysis. There are few trials of laparoscopic treatment.^{14,15} Surgical excision of endometriosis results in improved pain relief and improved quality of life after six months compared with diagnostic laparoscopy only.¹⁴ In one of the trials laparoscopic treatment also included uterine nerve ablation (LUNA),¹⁵ and pain improvement persisted for up to five years in more than half of the women.²⁶ About 20% of women do not report any improvement after surgery.¹⁴

No randomised controlled trials have compared laser versus electrosurgical removal of endometriosis, and only one small trial, with inconclusive results, compared excision versus ablation.²⁷

How often does Endometriosis Recur after Surgery?

Recurrence of endometriosis after laparoscopic surgery is common.^{16,26} Even with experienced laparoscopic surgeons, the cumulative rate of recurrence after five years is nearly 20%.¹⁷ Another study reported recurrence of dysmenorrhea in almost a third of women within one year of laparoscopic surgery in women who received no other treatment.¹⁶

What is the Evidence for Surgery in Women with Endometriomata?

Randomised controlled trials comparing excision or drainage and ablation for endometriomata 3 cm reported that recurrences were reduced and subsequent spontaneous pregnancy increased in the women who underwent excision.¹⁹ Though excisional surgery of the capsule could lead to removal of normal ovarian tissue and result in reduced ovarian reserve,^{20,28} there

is no evidence that this occurs, whereas a recurrence of the endometriomata will inevitably mean further surgery. Rectovaginal endometriosis presents surgical challenges because of difficult access and the possibility of injury to the bowel. Although reported long-term outcomes are encouraging with advanced laparoscopic techniques, there are few prospective studies and no randomised controlled trials.^{16, 17} One small study of the levonorgestrel intrauterine system in women with rectovaginal endometriosis found improved dysmenorrhea, pelvic pain, and dyspareunia after one year.²⁹ A trial comparing estrogen and progesterone combination with low dose progestogen in 90 women with rectovaginal disease reported substantial reductions at 12 months in all types of pain without major differences between groups.²¹ Overall, two thirds of patients were satisfied with this approach.

Should Women have Hormonal Treatment before Surgery for Endometriosis?

Only one study has examined this question. There was no evidence of a difference in the difficulty of surgery in the women who had received preoperative hormonal treatment.³⁰

Should Women have Hormonal Treatment after Conservative Surgery?

There was no evidence of improved pain relief with postoperative hormonal treatment (including danazol, GnRH analogues, oral contraceptives, and medroxyprogesterone acetate) up to 24 months after surgery.¹¹ The studies to date are small, however, and there is insufficient follow-up to rule out a benefit.

What are the Effects of Hormonal Treatment after Oophorectomy (with or without hysterectomy)?

There was no evidence of increased rates of recurrence in women who had both ovaries removed and who were given nearly four years of combined hormone therapy, but the study was underpowered to detect clinically important differences.²²

What is the Impact of Endometriosis on Fertility?

Although management of pain may be the more immediate issue, the long-term outcome of fertility should not be overlooked. Few studies have examined this. A systematic review of medical treatment for women with infertility and endometriosis did not find evidence of benefit,⁷ and it is not recommended for women trying to conceive.^{6,23} A systematic review of laparoscopic treatment of endometriosis in women with subfertility suggested an improvement in pregnancy rate in the 9-12 months after surgery.³¹ A second systematic review of laparoscopic excision compared with ablation endometriomata reported a five-fold increase in rate of pregnancy.¹⁹ There is the ongoing concern about ovarian reserve in women who have laparoscopic

excision.^{20,28} The other concern is the impact of endometriomata on artificial reproductive techniques.³² The European Society for Human Reproduction and Embryology (ESHRE) recommends surgery if endometriomata are 4 cm.²³

Aim of Study

The objective of this review was to determine the most effective technique of treating an ovarian endometrioma; either excision of the cyst capsule or drainage and electrocoagulation of the cyst wall. The end-points assessed were the relief of pain, recurrence of the endometrioma, recurrence of symptoms and in women desiring to conceive the subsequent pregnancy rate, either spontaneous or as part of fertility treatment.

Material and Methods

The reviewers searched the cochrane menstrual disorders and subfertility group specialised register of trials,²⁴ the cochrane register of controlled trials,²⁵ medline (1966-august 2007), embase²⁶ and reference lists of articles, the handsearching of relevant journals and conference proceedings and by the cochrane menstrual disorders and subfertility group trials register is based on regular searches of medline.

Selection Criteria

Randomised controlled trials of excision of the cyst capsule versus drainage and electrocoagulation of the cyst in the management of ovarian endometriomata.

Main Results

No randomised studies of the management of endometriomata by laparotomy were found. Two randomised studies of the laparoscopic management of ovarian endometriomata of greater than 3cm in size, for the primary symptom of pain were included. Laparoscopic excision of the cyst wall of the endometrioma was associated with a reduced recurrence rate of the symptoms of dysmenorrhea (OR 0.15 CI 0.06-0.38), dyspareunia (OR 0.08 CI 0.01-0.51) and non-menstrual pelvic pain (OR 0.10 CI 0.02-0.56), a reduced rate of recurrence of the endometrioma (OR 0.41 CI 0.18-0.93) and with a reduced requirement for further surgery (OR 0.21 CI 0.05-0.79) than surgery to ablate the endometrioma. For those women subsequently attempting to conceive it was also associated with a subsequent increased spontaneous pregnancy rate in women who had documented prior sub-fertility (OR 5.21 CI 2.04-13.29). A further randomised study was identified that demonstrated an increased ovarian follicular response to gonadotrophin stimulation for women who had undergone excisional surgery when compared to ablative surgery (WMD 0.6 CI 0.04-1.16). There is insufficient evidence to favor excisional surgery over ablative surgery with

respect to the chance of pregnancy after controlled ovarian stimulation and intrauterine insemination.

DISCUSSION

Endometriosis should be suspected in any woman of reproductive age who presents with dysmenorrhea or chronic pelvic pain. Only laparoscopy can reliably identify endometriosis. If endometriosis is diagnosed at the time of laparoscopy, laparoscopic surgery should be the first choice of treatment, especially in women of reproductive age with an endometrioma. In women with endometrioma, the cyst wall should be stripped out, instead of drainage and ablation, as the recurrences are fewer and pregnancy rates improved. At present, there is no evidence of benefit of postoperative medical treatment but the levonorgestrel intrauterine system has the potential for long-term use. In women who wish to conceive surgical, rather than medical, treatment should be offered.

Management of these blood filled cysts is controversial. The laparoscopic approach to the management of endometrioma is favored over a laparotomy approach as it offers the advantage of a shorter hospital stay, faster patient recovery and decreased hospital costs. Currently the commonest procedures for the treatment of ovarian endometrioma are either excision of the cyst capsule or drainage and electrocoagulation of the cyst wall. Although the surgery is more challenging. After an initial unsuccessful surgery for restoration of fertility in patients with advanced endometriosis, in vitro fertilization rather than repeat surgery is more effective. Laparoscopic treatment of endometriomas should be performed by excisional surgery. Drainage and/or medical therapy is associated with a very high recurrence rate. The main concern with excision of endometriomas is the potential to decrease ovarian reserve. Most experts would agree that if there is an endometrioma of 4 cm or greater that a laparoscopic excision be performed before an anticipated in vitro fertilization cycle to decrease the potential risk of infection and improve access to follicle.^{24,26}

Postoperative follow-up after laparoscopic ovarian endometrioma excision were studied retrospectively. Recurrence was defined as the presence of endometrioma more than 2 cm in size, detected by ultrasonography within 2 years of surgery. Fourteen variables (age, presence of infertility, pain, uterine myoma, adenomyosis, previous medical treatment of endometriosis, previous surgery for ovarian endometriosis, single or multiple cysts, the size of the largest cyst at laparoscopy, unilateral or bilateral involvement, co-existence of deep endometriosis, revised American Society for Reproductive Medicine (ASRM) score, postoperative medical treatment and postoperative pregnancy) were evaluated to assess their independent effects on the recurrence using logistic regression analysis. The overall rate of recurrence was 30.4% (68/224). Significant factors that were independently associated with

higher recurrence were previous medical treatment of endometriosis [odds ratio (OR) = 2.324, 95% confidence interval (95% CI) = 1.232–4.383, $P = 0.0092$] and larger diameter of the largest cyst (OR = 1.182, 95% CI = 1.004–1.391, $P = 0.0442$). Postoperative pregnancy was associated with lower recurrence (OR = 0.292, 95% CI = 0.028–0.317, $P = 0.0181$). Previous medical treatment of endometriosis or large cyst size was a significant factor that was associated with higher recurrence of the disease. Postoperative pregnancy is a favorable prognostic factor. Study of ovarian endometriosis after hormonal therapy, medical treatment led to an incomplete suppression of endometriotic foci.²⁶ Furthermore, second look laparoscopies performed after the resumption of menses have demonstrated that the disease may return with time when hormonal suppression is discontinued.^{4,15,28}

CONCLUSION

There is good evidence that excisional surgery for endometrioma provides for a more favorable outcome than drainage and ablation with regard to the relief of pain, recurrence of the endometrioma, recurrence of symptoms and in women desiring to conceive the subsequent pregnancy rate, either spontaneous or as part of fertility treatment.

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