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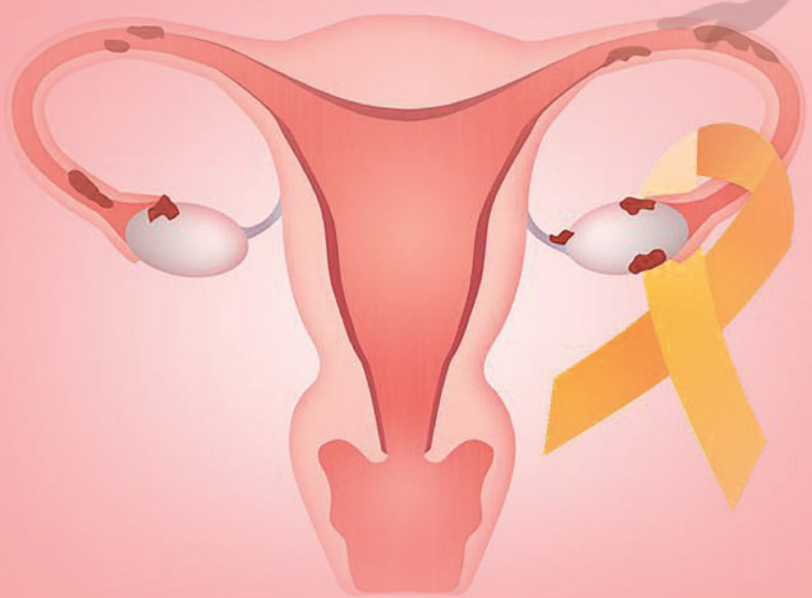
Demystifying Endometriosis



Kanthi Bansal

Foreword
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CHAPTER 4

Management of Pain in Endometriosis

Rajeev Agarwal, Kriti Agarwal, Apoorva Pallam Reddy

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INTRODUCTION

Endometriosis is a common benign gynecological condition defined by the presence of endometrial glands and stroma in sites outside the uterus such as ovaries, rectovaginal septum, pelvis, etc. with a highly variable clinical and surgical picture. Its etiopathogenesis remains elusive and there appears to be a polygenic and multifactorial pattern of inheritance. Endometriosis affects 6–10% of women of reproductive age[1] with prevalence rate as high as greater than one-third of women with infertility and two-thirds of women with chronic pelvic pain.[2] Endometriosis is frequently associated with dysmenorrhea, chronic pelvic pain, deep dyspareunia, dyschezia, and infertility. Ballard et al. found that 83% of women with endometriosis reported one or more of these symptoms to their general practitioners when compared with just 29% of controls.[3] Pain symptoms increase as depth of lesion increases, but no correlation has been found between pain intensity and stage of disease and progression can be highly unpredictable.

PATHOPHYSIOLOGY

Activated macrophages release cytokines, growth factors, and prostaglandins during menstruation in women who do not have endometriosis in order to regulate the peritoneal cavity by removing red blood cells, tissue fragments, and foreign endometrial cells. Women with endometriosis have a higher level of activated peritoneal macrophages. Therefore, the increased expression of cytokines and growth factors from the macrophages and their effects on the peritoneal environment is associated with the pathophysiology of endometriosis The cause of endometriosis-associated pain is unknown, but it has been suggested that peritoneal inflammation involving growth factors and cytokine production by activated macrophages, adhesion formation and irritation or direct invasion of pelvic floor nerves by infiltrating endometriotic implants may be responsible **(Box 1)**.[4]

Three well-recognized forms of endometriosis have been described here:[5]

1. *Peritoneal endometriosis* corresponds to minimal or mild endometriosis and usually no progression is observed.

Box 1: Mechanisms of pain in endometriosis.

- Distortion of pelvic anatomy
- Pelvic adhesions
- Cyclical bleeding within endometrial lesions
- Inflammation in peritoneal cavity and fluid
- Irritation and infiltration of nerves
- Neurogenesis
- Neuropathic hyperalgesia

2. *Ovarian endometriosis* is characterized by superficial ovarian implants or endometriotic cysts which may be adherent to the posterior aspects of the broad ligament.
3. *Deep infiltrating endometriosis (DIE)* involving the bowel, bladder, and rectovaginal septum is often associated with pelvic adhesions.

CLINICAL FEATURES

Despite the increasing awareness of endometriosis, there are often significant delays between the onset of symptoms to definitive diagnosis, with a mean latency of 8 years in the UK and 11.7 years in the USA.[6] One reason for this delay is the significant overlap in symptoms with other conditions such as pelvic inflammatory disease, irritable bowel syndrome, urinary tract infection, interstitial cystitis, and depression. Another reason can be that women may delay seeking medical attention in the misconception that painful symptoms are part of a "normal" menstruation. However, it is quintessential to be aware of classical symptoms of endometriosis, to pick it up before much of damage has been done. The diagnosis of endometriosis is first suspected based on the history, then investigated by physical examination and imaging.

Endometriosis afflicts women of reproductive age; the average age at first diagnosis is 28 years. Endometriosis is frequently associated with dysmenorrhea, chronic pelvic pain, deep dyspareunia, dyschezia, and infertility. Dysmenorrhea is typically defined as triple dysmenorrhea, that is, it begins before onset of menstrual cycles, continues throughout, and persists after cessation of periods. Additionally, it is progressive in nature and tends to get worse with successive cycles due to the subsequent scarring with each monthly bleed. Endometriosis should be considered especially if patients present with dysmenorrhea after having previous pain-free menstrual cycles. Dyschezia during menstruation and deep dyspareunia are stronger predictors of DIE (74.5% sensitivity, 68.7% specificity, 2.4 positive likelihood ratio, and 0.4 negative likelihood ratio).[7]

Mathias et al. underlined also that women diagnosed with endometriosis reported maximum health distress, pain during or after intercourse, and interference with activities because of pain.[8] In addition, women with

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endometriosis often experience higher incidents of depression and emotional distress due to the uncertainty of diagnosis, unpredictability of symptoms and repeated dismissal of their experiences.

Routine vaginal examination alone is insufficient to make a diagnosis of endometriosis. However, the location and extent of endometriosis can sometimes be determined by clinical examination, especially endometriomas can be palpated through the fornices and tender nodularity in pouch of Douglas (POD) is suggestive of DIE. Particular emphasis should be placed on the visualization of lesions which appear as dark-blue nodules in posterior fornix and increase in size during menstruation.

DIAGNOSIS

Recent advances in imaging modalities, including transvaginal ultrasound and magnetic resonance imaging, have improved the noninvasive preoperative diagnosis of endometriosis. Transvaginal ultrasonography can be used to identify size and location of endometriotic cysts and bladder lesions, but it may be difficult to distinguish among ovarian endometriomas, cysts, tumors, ectopic pregnancies, tubal cysts or abscesses. Endorectal ultrasonography is a reliable tool but is limited to identifying rectal infiltration associated with deep pelvic endometriosis. MRI can be used to detect up to 82% of endometriomas ≥1 cm and 50% of hemorrhagic lesions ≤5 mm due to the small implant size and variable appearance.[9]

Diagnostic laparoscopy for visualization and biopsy of lesions remains the gold standard for diagnosis after ruling out other causes of pelvic pain, such as upper genital tract infection, adenomyosis, and pelvic inflammatory disease. It is important to note that not all endometriosis lesions are visualized at surgery; lesions may be hidden by pelvic organs or adhesions. Therefore, techniques such as peritoneal fluid aspiration, adhesiolysis, and mobilization of adherent structures such as ovaries from the pelvic wall and biopsy of lesions are typically performed to thoroughly examine the cul-de-sac and pelvic organs and confirm the presence of endometriosis.

MEDICAL TREATMENT

Analgesics

Nonsteroidal anti-inflammatory drugs (NSAIDs) are widely used as a first-line treatment of endometriosis-associated pain. Elevated prostaglandin levels in the peritoneal fluid and endometriotic tissue of women with endometriosis support their use. A Cochrane review on the role of NSAIDs in treating endometriosis-related pain analyzed one randomized controlled trial (RCT) comparing naproxen sodium (275 mg, four times daily) with placebo but found no significant difference.[9,10] No evidence shows whether any individual

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NSAID is more effective than another. Another study that investigated the use of a cyclo-oxygenase-2 inhibitor (rofecoxib) against a placebo (n = 28) reported significant improvement of dysmenorrhea, dyspareunia and chronic pelvic pain.[11] Although that study reported no adverse effects, Merck & Co. has since withdrawn rofecoxib because of its cardiovascular toxicity.[12]

There are no other RCTs on the use of analgesics (paracetamol, aspirin, ibuprofen, opioids) for treating endometriosis-associated pain.[13]

Specialist help from a multidisciplinary pain team may be required for complex cases, where pain-modulating drugs such as pregabalin or gabapentin may be considered, or low-dose amitriptyline.[14]

Category: NSAIDs
Mechanism of action: Reversible inhibition of COX-1 and COX-2 enzymes
Dose: Ibuprofen—400 mg q4 6 hourly, naproxen—500 mg q1 2 hourly

Hormonal Therapies for Treating Endometriosis-related Pain

Endometriosis is a progressive disease which gets exacerbated with each monthly bleed due to the increasing collection of menstrual blood in pelvis due to retrograde menstruation, leading to adhesions. Thus, hormonal suppression to achieve amenorrhea is considered a medical approach for treating the disease and its symptoms. Currently, combined oral contraceptive pills (COCPs), progestogens, antiprogestogens, gonadotropin-releasing hormone (GnRH) agonists, antagonists, and aromatase inhibitors (AIs) are in clinical use. The European Society of Human Reproduction and Embryology (ESHRE) guideline states that it is reasonable to commence empirical treatment with analgesia and/or hormones before a diagnosis of endometriosis is confirmed, provided woman has been counseled thoroughly about the efficacy, adverse effect profile, and availability of the different management options.[13]

Combined Hormonal Contraception

Modern low-dose COCP is now widely used to treat endometriosis-related pain as it offers many practical advantages, including contraceptive protection and cycle control apart from alleviating symptoms in 74% of cases. A recent double-blind, randomized, placebo-controlled trial studied the effectiveness of low-dose COCP compared with placebo for endometriosis-associated pain over four cycles, and concluded that pain scores for the COCP group were significantly reduced compared with placebo.[15]

Changing from cyclical to continuous treatment may improve symptoms; however, moderate-to-severe adverse effects such as irregular bleeding, weight gain, headache, thrombophlebitis, pulmonary embolism, cerebral thrombosis and hemorrhage, hypertension, benign liver tumors, and gallbladder disease have been reported in 14% of women.[16]

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Category: Combined hormonal contraceptive (ethinyl estradiol with norethindrone, norgestrel, levonorgestrel or desogestrel)
Mechanism of action: Inhibit FSH and LH, enhanced apoptosis of endometrial implants, decrease cell proliferation
Dose: Continuously or cyclical for 3 months or more
Route:
1. Oral-20 µg ethinylestradiol, 150 µg desogestrel
2. Ring-3-weekly vaginal rings (15 µg of ethinylestradiol and 120 µg etonogestrel)
3. Patch-weekly transdermal (60 µg of ethinylestradiol and 6 mg of 17-deacetylnorgestimate)

Progestogens and Antiprogestogens

The ESHRE recommends that clinicians take the different side effect profiles of progestagens and antiprogestagens into account when prescribing these drugs, especially irreversible side effects (e.g., thrombosis, androgenic side effects).[13] There was no evidence of a benefit with depot or oral progestogens over other treatments (COCP or leuprolide acetate) for endometriosis-related symptoms.[17]

A recent Cochrane review concluded that medroxyprogesterone acetate (100 mg daily) is significantly more effective in reducing all symptoms when compared with placebo; however, its use was associated with significantly more cases of acne and edema.

No studies have assessed the effectiveness of the progestogen-only pill Cerazetteâ for endometriosis, and the recommendation to offer it is a pragmatic approach based on better side effect profile compared to combined oral contraceptive (COC).

The levonorgestrel-releasing intrauterine system (LNG-IUS) releases levonorgestrel directly into the uterine cavity at a relatively constant rate of 20 µg/day for 5 years. Levonorgestrel exerts strong local activity rendering the endometrium atrophic and inactive, although ovulation is usually not suppressed. RCTs on LNG-IUS have shown that it significantly improves endometriosis-related pain, but this was not significantly different when compared with the effect of leuprolide acetate, aGnRH agonist.[17,18] However, LNG-IUS has a significantly better adverse effects profile as the action is local rather than systemic.[19]

Dienogest is a newer progestogen-only hormone preparation for the treatment of endometriosis. Daily dienogest 2 mg significantly reduces the severity of endometriosis and dyspareunia and is comparable to GnRH agonists.

Dienogest is contraindicated in undiagnosed vaginal bleeding and during pregnancy and lactation, active thromboembolic disorder or a history of cardiovascular disease, diabetes and severe hepatic disease, a history of liver tumors or sex hormone-dependent malignancies. If cholestatic jaundice or pruritis develops, dienogest should be stopped. Although

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ovulation is inhibited in most patients, dienogest is not a contraceptive and use of a nonhormonal method is recommended while taking dienogest. The menstrual cycle resumes within 2 months of stopping the drug.

Anti-progestogens (i.e., a substance that prevents cells from making or using progesterone) such as gestrinone exert antiproliferative effects on the endometrium while maintaining serum estradiol levels in the early to mid-follicular phase, thereby having a better adverse effect profile by avoiding the bone mass loss and hypoestrogenism associated with the use of progestogen-only.[17]

Both continuous progestagens and continuous gestrinone are effective therapies for the treatment of painful symptoms associated with endometriosis.[13]

Category: Progestin-only preparations
Mechanism of action: Inhibit follicle-stimulating hormone (FSH) and luteinizing hormone (LH), enhanced apoptosis of endometrial implants, decrease cell proliferation
Dose:
- Norethindrone—2.5 mg/day up to 30 mg/day orally
- Medroxyprogesterone—10 mg/day up to 50 mg/day orally or as depot of 150 mg IM every 3 months
- Cyproterone acetate—12.5 mg/day orally
- Levonorgestrel IUS—52 mg releasing 20 µg/day for 5 years
- Dienogest—2 mg daily orally

Category: Antiprogestin
Mechanism of action: Prevents cells from making or using progesterone, exert anti-proliferative effects on the endometrium
Dose: Gestrinone orally 2.5 mg weekly

Gonadotropin-releasing Hormone Agonists

Gonadotropin-releasing hormone agonists (nafarelin, leuprolide, buserelin, goserelin, or triptorelin), deplete the pituitary of endogenous gonadotropins and inhibit further synthesis, thus inducing a hypoestrogenic state resulting in the interruption of the menstrual cycle, and endometrial atrophy and amenorrhea. A Cochrane review of 41 RCTs concluded that GnRH agonists were more effective than placebo but were inferior to LNG-IUS or danazol for relieving endometriosis-associated pain, given its worse adverse effects profile. The hypoestrogenic effects of GnRH agonists include loss of bone mass of up to 13% at 6 months (reversible with discontinuation of therapy), therefore, the simultaneous use of hormonal add-back therapy is recommended. Hormonal add-back therapy has not been shown to reduce the efficacy of GnRH agonists. This can be explained by the estrogen threshold theory, which suggests that lower levels are needed to protect bone and cognitive function and to avoid/minimize menopausal symptoms

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such as hot flushes, sleep disturbance, and mood swings than to activate endometriotic tissue.[20-23] Although evidence is limited regarding dosage or duration of treatment, nonetheless special consideration to be given to GnRH agonists in young women and adolescents, since these women may not have reached maximum bone density.

Category: GnRH agonists
Mechanism of action: Chronic administration results in decreased follicle-stimulating hormone (FSH) and luteinizing hormone (LH) resulting in decreased steroid synthesis
Dose: Leuprolide—3.75 mg monthly or 11.25 mg/3 monthly IM, with add-back therapy of norethindrone 5 mg/day

Gonadotropin-releasing Hormone Antagonist

Designing an effective oral GnRH antagonists has been a major drug development goal for the treatment of endometriosis-associated pain. The difficulty has been finding a potent drug that simultaneously blunts hypoestrogenic side effects. A first-generation nonpeptide GnRH antagonist, NBI-42902 was developed and described in 2005, but subsequent human studies showed inhibition of the liver P450 enzymes. Elagolix, a second-generation GnRH antagonist, was subsequently developed with rapid onset of action, good tolerability, and no changes in hepatic enzymes. In addition, its therapeutic and hypoestrogenic effects are rapidly reversed after cessation of therapy. Furthermore, there is a dose-dependent decrease in dysmenorrhea and nonmenstrual pelvic pain in women with endometriosis. Additionally, elagolix is clinically efficacious at two doses (200 or 150 mg daily), allowing the drug to be tailored according to individual needs. Other advantages of elagolix include its immediate suppression of pituitary gonadotrophs, avoiding the initial 1–2 week flare-up effect of GnRH agonists and thereby providing immediate therapeutic effect.

Aromatase Inhibitors

Aromatase inhibitors have been studied for treating endometriosis despite the controversies surrounding the evidence for increased expression of aromatase P450 in endometriotic tissue.[24] The most common third-generation AIs letrozole and anastrozole are reversible AIs, competing with androgens for aromatase-binding sites. The adverse effects are mostly hypoestrogenic and include vaginal dryness, hot flushes, and diminished bone mineral density. Earlier reports of increased cardiovascular risks have not been substantiated.[13]

A systematic review found that treatment with oral letrozole plus norethisterone acetate (NEA) or desogestrel, or anastrozole as vaginal suppository (250 μg daily) or orally (1 mg daily) in combination with oral

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contraceptive pill (OCP) resulted in a significant decrease of endometriosis-associated pain in premenopausal women. The same appears to be true for letrozole plus either NEA or triptorelin, although letrozole plus triptorelin resulted in more side effects than NEA. The authors concluded that in women with pain from rectovaginal endometriosis refractory to other medical or surgical treatment, clinicians can consider prescribing AIs in combination with OCPs, progestagens, or GnRH analogs, as they reduce endometriosis-associated pain.[24]

Category: Aromatase inhibitors
Mechanism of action: Blocks conversion of androgen to estrogen decreasing growth of ectopic implants
Dose: Letrozole-2.5 mg/day, anastrozole-1 mg/day

SURGICAL TREATMENT

The ESHRE supports a "see and treat" approach, but acknowledges that symptoms do not always relate to the severity of clinical disease, and unexpected severe disease may be discovered at initial laparoscopy, which may require further counseling and subsequent surgical treatment. Also, laparoscopy that reveals minimal or mild endometriosis may be difficult to interpret, as the findings may be nonspecific and not necessarily the cause of pain, and if treated at laparoscopy, might not be successful in treating the pain. It is important to note that the response to hormonal therapy has not been shown to always predict the presence or absence of endometriosis.

A woman with endometriosis should receive appropriate preoperative counseling including increased risk of bowel and bladder in DIE, injury to ureters in severely adherent endometrioma, recurrence of pain symptoms and fertility issues. A minimally invasive approach provides superior views of the pelvic organs and is associated with less pain, shorter hospital stay, quicker recovery, and better cosmesis. Laparotomy may rarely be necessary for advanced disease with extensive adhesions or when there is adjoining organ involvement. Nonetheless, both are equally effective. Surgical procedures include excision, fulguration or laser ablation of peritoneal endometriotic implants; excision, drainage, or ablation of endometriomas; resection of rectovaginal nodules; and adhesiolysis.

Surgery for Endometrioma-associated Pain

Laparoscopic excision of ovarian endometriotic cyst walls (≥3 cm) is superior to drainage and coagulation by bipolar diathermy for treating the recurrence of dysmenorrhea, dyspareunia and nonmenstrual pain as well as reducing the rates of subsequent surgery.[25] While the superiority of excision over drainage and coagulation/ablation might be expected, concerns about

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excessive resection of ovarian tissue compromising future fertility remain, with a reported risk of ovarian failure after bilateral ovarian endometrioma cystectomy of 2.4%.[26] It should be noted that endometriomas are strongly associated with DIE.[27] Clinicians can use oxidized regenerated cellulose during operative laparoscopy for endometriosis, as it prevents adhesion formation. Additionally, ovarian suspension to abdominal wall following cystectomy may prevent POD obliteration with subsequent monthly bleeds. Postoperative hormonal therapy may not improve the outcome of surgery but is an important adjunct to surgery to prolong the symptom-free interval and prevent recurrence of symptoms. Moreover, as there is no proven harm, so postoperative hormonal therapy could be prescribed for other indications, such as contraception or secondary prevention.[13]

In women operated for endometriosis, clinicians are recommended to prescribe postoperative use of a LNG-IUS or a combined hormonal contraceptive for at least 18–24 months, as one of the options for the secondary prevention of endometriosis-associated dysmenorrhea, but not for nonmenstrual pelvic pain or dyspareunia.[13]

Surgery for Deep Infiltrating Endometriosis-associated Pain

Deep infiltrating endometriotic nodules may involve the uterosacral ligaments, pelvic side walls, rectovaginal septum, vagina, bowel, bladder, or ureter. Bowel endometriosis usually affects the rectosigmoid colon and can be associated with symptoms such as bowel cramping, diarrhea, or dyschezia.[28]

Medical management of DIE with colorectal extension is usually suppressive and not curative and is often associated with significant adverse effects.[29] It is unclear whether medical management prevents disease progression; however, discontinuing medical treatment commonly results in the recurrence of symptoms.[30]

It is widely agreed that severe endometriosis, especially in symptomatic DIE with colorectal extension, requires surgical treatment. Surgical strategies include superficial shaving, discoid resection or segmental resection of the involved bowel segments to remove the endometriotic nodules. Although there is an ongoing debate about the indication for shaving nodules as opposed to segmental resection, most studies have reported improvement in pain outcome, quality-of-life and gynecological and digestive symptoms after surgery for colorectal endometriosis. The reported intraoperative complication rate was 2.1%, and the total postoperative complication rate was 13.9% (9.5% minor, 4.6% major).[31] The recurrence rates following colorectal endometriosis surgery in studies with more than 2 years of follow-up were 5–25%.[28]

Surgical treatment for bladder endometriosis is usually excision of the lesion and primary closure of the bladder wall. Ureteral lesions may be

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excised after stenting the ureter; however, segmental excision with end-to-end anastomosis or reimplantation may be necessary if there are intrinsic lesions or significant obstruction.[14]

Hysterectomy for Endometriosis

Hysterectomy with bilateral salpingo-oophorectomy is generally reserved for women with debilitating symptoms attributable to endometriosis who have completed childbearing and in whom other medical therapies have failed. There are no RCTs on hysterectomy (with or without oophorectomy) for treating endometriosis-associated pain, but a review concluded that hysterectomy was successful in many women, but not all.[32]

An informed consent should be taken in this context from all patients. The success of this approach is attributed to debulking of the disease and the resulting surgical menopause causing endometrial tissue atrophy. Ovarian conservation at hysterectomy presents a sixfold greater risk for the development of recurrent pain and an 8.1 times greater risk of reoperation. Hysterectomy is also used successfully to treat idiopathic dysmenorrhea and adenomyosis.[33] The 2014 ESHRE guidelines suggest combined estrogen and progestogen therapy or tibolone for treating menopausal symptoms in women with surgically induced menopause because of endometriosis, at least up to the age of natural menopause.[13]

Nerve Interrupting Surgeries

An alternative strategy for controlling endometriosis-related pain is interrupting the nerve pathways. A 2005 Cochrane review concluded that laparoscopic uterosacral nerve ablation conferred no additional benefit over conservative surgery, while presacral neurectomy combined with laparoscopic ablation of endometriotic tissue significantly improved dysmenorrhea and reduced severe midline pain at 6 and 12 months. However, performing presacral neurectomy requires a high degree of skill and is associated with increased risk of adverse effects such as bleeding, constipation, painless first stage of labor, urinary urgency, and is seldom performed.[34]

ADJUNCT THERAPY

An RCT investigating the use of nutritional supplements on endometriosis demonstrated that 2-month high-dose vitamin E and C therapy was associated with significant improvement in pain.[35] It has been suggested that there is an inverse association between body mass index and endometriosis. This association may correlate with lower peripheral body fat distribution and with less estrogen resistance.[14]

A small Italian study in 2014 suggested that some mood or anxiety disorders, high alexithymia, and malfunctioning obsessive-compulsive

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symptoms are more frequent in women with endometriosis than in the general population.[36] Thus, some women with endometriosis may benefit from working with a counselor/psychologist to develop strategies on breaking the pain cycle, dealing with stress and anxiety and resolving personal negative feelings.[14]

KEY CONTENT

- The nonspecific signs and symptoms of endometriosis contribute to significant diagnostic delay.
- Treatment for endometriosis-related pain symptoms includes a range of medical and surgical options.
- Minimally invasive surgery should be performed by a surgeon trained to undertake surgical treatment for mild to moderate disease, thereby avoiding the need for repeat laparoscopy in the absence of severe disease, i.e., a "see and treat" policy.

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Demystifying Endometriosis

Salient Features

- Endometriosis is a mysterious disease, has no cure till date.
- The intense desire to demystify this condition and give the clinicians a chance to go as close to the correct management, for the university and medical college teachers and professors to comprehensively teach students, postgraduates is the aim of this book.
- There are many aspects and impacts of endometriosis, which have been covered in this book. The latest molecules modalities of treatment, newer advances and current consensus regarding management of endometriosis are covered.
- The authors of the chapters are stalwarts and experts in the area of endometriosis and they have diligently shared their knowledge and expertise in the format of the chapters.
- The beauty of the book is that it is strongly supported by evidences, references, illustrations, diagrams, tables and boxes, so that it is simple to understand and at the same time supports evidence-based medicine.
- The patients of endometriosis are in deep agony and running from pillars to posts hoping for relief. On the other hand some patients of endometriosis have infertility and deeply distressed. It would be a boom if the patients get perfect treatment.
- This book will go in a long way to help patient management and increase the knowledge amongst clinicians.



Kanthi Bansal MD DGO FICOG is the Director of Safal Fertility Foundation and Bansal Hospital, Ahmedabad, Gujarat. She is a pioneer in the techniques of Assisted Reproduction in Western part of India. She has many firsts in the field of ART to her credit. She has the distinction of producing the first single mother of India and the first In Vitro Fertilization (IVF) baby of Gujarat. She has established dedicated PCOS and Endometriosis Clinic. She has centers at Ahmedabad, Bengaluru, and Varanasi, two centers at Prayagraj, Abohar, Motimari and Chhindwara.

She has been awarded with the prestigious Royal College of Obstetricians and Gynecologists (RCOG) Distinguished Service Medal for dedication and achievement in the development of women's healthcare. She has served in esteemed organizations like South Asia Federation of Obstetrics and Gynaecology (SAFOG), Federation of Obstetric and Gynecological Societies of India (FOGSI), Indian Society of Assisted Reproduction (ISAR), The PCOS Society, and Indian Menopausal Society (IMS).

She is the Editor of the Journal of Endometriosis and Pelvic Pain Disorders, National Advisory Board of the Journal of Human Reproductive Sciences (JHRS) and a Peer reviewer of renowned journals such as the Journal of Obstetrics and Gynecology of India (JOGI), and Journal of Reproductive and Stem Cell Biotechnology (JRSCB). She has published several National and International scientific papers and articles. Publications of books have been very close to her heart and she feels it is one of the best ways to propagate knowledge to the clinicians at teaching institutes, practicing doctors and postgraduates. Considering the same, she has published 14 books till date in the field of infertility management, PCOS and Endometriosis. These books are available at international and national platforms both in hard copies and e-books. She has contributed towards numerous social activities for women health, empowerment and development.

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