

To Print: Click your browser's PRINT button.

NOTE: To view the article with Web enhancements, go to:
<http://www.medscape.com/viewarticle/408847>

Inflammatory Bowel Disease--A Complicating Factor in Gynecologic Disorders?

Anne M. Weber, MD, Jerome L. Belinson, MD, Cleveland Clinic Foundation

Medscape General Medicine 1(2), 1999. © 1999 Medscape

Posted 02/12/1997

Abstract and Introduction

Abstract

Gynecologic disorders occur commonly in women with Crohn's disease and ulcerative colitis. Frequently, these women also suffer menstrual disorders with gastrointestinal symptoms that overlap with those related to inflammatory bowel disease (IBD). Knowledge of the range of gynecologic problems--for example, dysfunctional uterine bleeding, fistula or abscess of the perineum or vagina, dyspareunia, subfertility possibly due to tubal blockage, and ovarian dysfunction related to bowel disease--that have been associated with IBD will assist practitioners in treating these women. Prostaglandins, released by the endometrium at menstruation, cause contraction of uterine smooth muscle, resulting in the cramping pain of dysmenorrhea. Prostaglandins also are an important component of the inflammatory process in active IBD; by increasing contractility of GI smooth muscle, they are associated with diarrhea and abdominal pain. Menstrual pain and menses-related GI symptoms may be difficult to distinguish from symptoms related to IBD. Endometriosis may present with symptoms similar to an acute episode of IBD. Mucosal changes in the bowel can occur in association with endometriosis, and can be confused with the histologic features of IBD. The distinction is important. For example, while nonsteroidal anti-inflammatory drugs may relieve symptoms of dysmenorrhea, they often are contraindicated in IBD. To provide optimal evaluation and treatment, all health care professionals who treat women with IBD should be aware of the spectrum of gynecologic conditions that may be encountered.

Introduction

Inflammatory bowel diseases (IBDs), including Crohn's disease and ulcerative colitis, are a set of chronic recurring diseases with equal gender ratio.^[1] Most patients are diagnosed in young adulthood, although the disorder may develop at any time of life. The incidence of IBD is relatively low, with 9-10 cases of Crohn's disease and 15-19 cases of ulcerative colitis per 100,000 women occurring each year.^[2,3] However, because of recurring episodes of active disease, the prevalence of IBD is much higher than the incidence. The prevalence of ulcerative colitis is between 70 and 99 cases per 10,000 people. That is about twice the prevalence of Crohn's disease, which is between 35 and 56 cases per 10,000 people.^[4] By not identifying asymptomatic cases, current studies probably underestimate the true prevalence of IBD by 27% to 38%.^[4]

The causes of IBD are unknown. It is likely that genetic factors are important, since there is an increased risk in first-degree relatives.^[1] Environmental factors are also important. The incidence of ulcerative colitis is inversely related to smoking, while Crohn's disease is directly associated with smoking.^[5] Pathophysiologic features of the diseases show some overlap. Crohn's disease is characterized by transmural bowel inflammation, most commonly affecting the terminal ileum and colon, although the alimentary tract may be affected at any site. Symptoms include abdominal pain, diarrhea, fever, weight loss, fistula formation, and extra-intestinal manifestations, including arthritis,

uveitis, and erythema nodosum. The pathologic features of ulcerative colitis include superficial ulceration extending in a continuous fashion proximally from the rectum. The cardinal symptom is bloody diarrhea; systemic symptoms and signs are less common than with Crohn's disease. Indeterminate colitis refers to those cases where a definite distinction between Crohn's disease and ulcerative colitis cannot be made (Fig. 1).

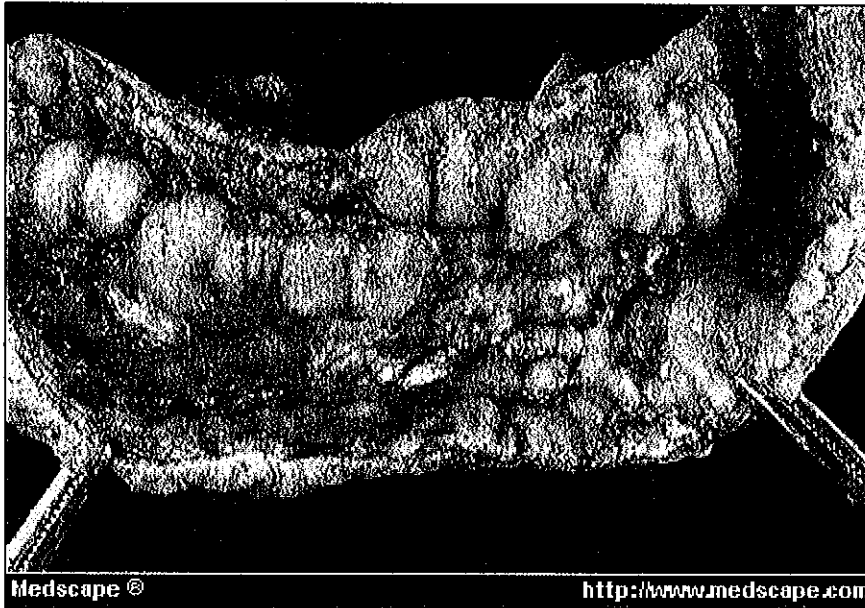


Figure 1. Crohn's disease involving the small intestine. Mucosal surface shows hyperemia and focal areas of ulceration. Reprinted with permission from The University of Utah Health Sciences Center WebPath Copyright © 1994-1996, 1997 by Edward C. Klatt, MD, The University of Utah Health Sciences Center, and by designated contributors.



Figure 2. Eroded mucosal surface in ulcerative colitis extending proximally from rectum. Only islands of mucosa remain, creating "pseudopolyps." Reprinted with permission from The University of Utah Health Sciences Center WebPath Copyright © 1994-1996, 1997 by Edward C. Klatt, MD, The University of Utah Health Sciences Center, and by designated contributors.

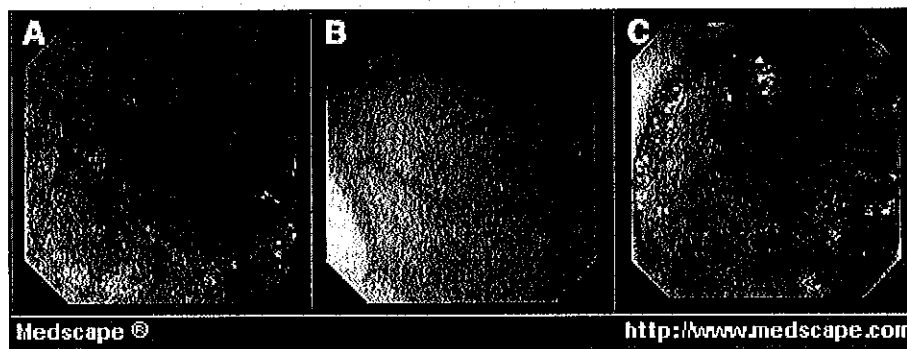


Figure 3. Endoscopic view of (A) bowel with mild Crohn's; (B) normal bowel; © bowel with mild ulcerative colitis. Reprinted with permission from Atlas of Gastrointestinal Endoscopy, Copyright ©1997, Atlanta South Gastroenterology, P.C. All rights reserved.

Gynecologic disorders occur commonly in women with IBD, although they have received relatively little study.^[6,7] There may be considerable overlap in symptoms attributable to gynecologic disorders, IBD, or both. Knowledge of the range of gynecologic problems that women with IBD may experience will assist practitioners in caring for these women. This article reviews the relevant literature and presents strategies for identifying and managing common gynecologic disorders in women with IBD. The challenge is often to identify and correctly associate the condition with IBD, so that further evaluation and management can be carried out as indicated.

Menstrual Abnormalities Linked to IBD in Pathogenesis

The interaction between GI function and menstrual function is complex, and not completely understood. Prostaglandins are an important component of the inflammatory process in active IBD, and, by increasing contractility of GI smooth muscle, they are associated with diarrhea and abdominal pain. Prostaglandins are also released by the endometrium during menstruation, causing contraction of uterine smooth muscle and resulting in the cramping pain of dysmenorrhea. By this mechanism, symptoms attributed to menstruation and IBD may overlap. About two thirds of women describe a change in bowel habits with menses, with about half of those experiencing loose or more frequent stools.^[8] Women with dysmenorrhea experience even more menses-related GI symptoms than women without dysmenorrhea.^[9] Although this has not been specifically studied, it is possible that women may experience an exacerbation of symptoms of IBD during menses.

The influence of sex steroid hormones on the GI tract is controversial. Some studies report prolonged GI transit time in the luteal phase of the menstrual cycle, after ovulation, when progesterone levels are increased, compared with the pre-ovulation, or follicular, phase in the first half of the cycle.^[10,11] However, other studies have not found a menstrual cycle-related difference in transit time.^[12-14] Whether sex steroid hormones exert an influence on IBD is unknown.

The prevalence of menstrual abnormalities has not been well studied in women with IBD. There are no data regarding menstrual patterns in women whose IBD has been medically managed. Among women who have had surgery related to IBD, the prevalence of all menstrual abnormalities, such as menorrhagia and irregular menses, was 60% in women with Crohn's disease and 53% in women with ulcerative colitis.^[7] Menstrual patterns were similar in women before and after proctocolectomy for IBD.^[15,16] For example, 31% of women experienced menstrual problems after ileal pouch-anal anastomosis, versus 23% before surgery.^[17] The high rate of menstrual abnormalities in women with IBD has not been explained, although it seems likely that menstrual disturbances would be more common in women whose IBD was severe enough to require surgery. Disruption of normal menstruation could be related to impaired ovarian function due to the stress of chronic disease, multiple surgeries, or poor nutrition.

Endometriosis may coexist with IBD, with symptoms typically worsening during the luteal phase and peaking during menstruation. As already mentioned, menstrual pain and possibly menses-related GI symptoms may be difficult to distinguish from symptoms related to IBD. Endometriosis involving the small or large bowel may present with symptoms similar to an acute episode of IBD.^[18-20] Mucosal changes in the bowel can occur in association with endometriosis, and can be confused with the histologic features of IBD.^[21]

Differences in medical management. Menstrual abnormalities can usually be managed using standard treatments. In general, medical treatment, which is associated with relatively low risk and low cost, is recommended as the first line of therapy. Dysmenorrhea typically responds well to nonsteroidal anti-inflammatory drugs (NSAIDs). However, because NSAIDs can cause GI irritation, ulceration, and bleeding, they should generally be avoided in women with IBD.^[1] The mainstay of managing menstrual abnormalities is hormonal therapy. Yet, the use of oral contraceptive pills (OCPs) in women with IBD or in those at risk for IBD is somewhat controversial. The debate centers on 2 main issues.

The first issue is whether OCPs are causally related to the development of IBD. In rare cases, OCPs have been associated with a form of thrombotic colitis that has pathologic features similar to those seen with Crohn's disease, which resolves when OCPs are discontinued.^[22-29] However, almost all of these cases were associated with relatively high-dose estrogen OCPs. The dose of estrogen in current OCPs is associated with a much lower risk of thrombotic events.^[30] One of the proposed pathogenetic mechanisms for IBD, specifically Crohn's disease, involves multifocal GI infarction mediated by a chronic mesenteric vasculitis.^[31,32] Study of the relationship between the development of IBD and the use of OCPs has produced conflicting results. The weight of evidence based on prospective^[2,3] and case-controlled studies^[33-35] shows no significant relationship between OCP use and the development of either Crohn's disease or ulcerative colitis. Other case-control studies have shown a modest increase in relative risk for the development of IBD. This effect was seen only in some subgroups of women using OCPs--for example, those with extended-duration OCP use.^[36-39]

The second issue is whether the use of OCPs in women with IBD has any influence on disease activity. There is no evidence that women with IBD experience a difference in disease activity related to OCPs, although this has received very little attention. Only 1 study has examined this issue. That study, which stratified surgical outcomes by OCP use in women treated surgically for Crohn's disease, failed to show an increased rate of recurrent surgery in

women taking OCPs.^[40]

OCPs are useful in the treatment of women with menstrual abnormalities. They can be used to treat menorrhagia (excessive menstrual blood loss) and irregular menstruation, including menstrual intervals that are abnormally short (polymenorrhea) or abnormally long (oligomenorrhea). OCPs promote regular menses, with duration and amount of menstrual flow usually less than in a woman's natural cycle. OCPs are also very effective in the treatment of dysmenorrhea and can be used as a treatment for endometriosis. By suppressing ovulation, OCPs can help prevent the development of functional ovarian cysts.

Differences in surgical management. If medical therapy is not successful in resolving menstrual abnormalities, surgery may be indicated. Women with IBD may be good candidates for conservative surgery such as endometrial ablation, to avoid the potential morbidity of a hysterectomy. Little information is available about the indications for and outcome of hysterectomy in women with IBD. In one series of women who had previously had surgery for IBD, 18% of women had undergone hysterectomy at a mean age of 36 years.^[7] The most common indications for hysterectomy in this study were abdominal pain and abnormal uterine bleeding; in contrast, fibroids are the most common indication for hysterectomies overall.^[41]

Perineal Disorders

The key to the diagnosis of perineal disorders in women with IBD is to maintain a high index of suspicion for conditions that may not be simply gynecologic disorders. This is particularly challenging in women who do not already carry the diagnosis of IBD. Perineal involvement in IBD, particularly in Crohn's disease, may antedate the development of bowel symptoms by years. In a woman with established IBD, any condition of the perineum should be considered related to the IBD until proven otherwise.^[42]

Early case reports of vulvar Crohn's disease suggested that IBD affecting the vulva was rare.^[43-49] However, more has been written about this topic recently, and it seems likely that perineal and vulvar manifestations of IBD are under-recognized and underreported.^[50-63] Cutaneous manifestations of Crohn's disease can occur in up to 44% of patients, either with fistulous extensions to perineal skin or with so-called metastatic lesions, which are separated from intestinal lesions by intervening normal skin.^[64] Differential diagnoses should be considered for vulvar conditions in women with IBD, including severe herpes, Behçet's syndrome, lymphogranuloma venereum, fungal disease, foreign body reaction, actinomycosis, lymphangiectasia, and vulvar tuberculosis or sarcoidosis.^[65] The differential should also include hidradenitis suppurativa, a chronic skin infection of apocrine sweat glands with chronic draining abscesses, sinuses, and fistula formation.^[66] Crohn's disease coexists with hidradenitis of the perineum in up to 39% of patients with hidradenitis suppurativa, further complicating its diagnosis and management.^[67]

Fistulas and abscesses--epidemiology. The occurrence of a fistula or abscess of the perineum or vagina should always raise the suspicion of IBD, particularly Crohn's disease, even in the absence of bowel symptoms. Rectovaginal fistulas have been reported in up to 23% of women with Crohn's disease.^[68] In a large series of women with rectovaginal fistulas, 15 of 138 (11%) were due to Crohn's disease.^[69] Fistula formation is characteristically associated with Crohn's disease, but anorectal complications, such as draining sinuses and fistulas, also occur with ulcerative colitis.^[70] Crohn's disease should be suspected whenever a rectovaginal fistula develops after vaginal delivery. This may occur with or without breakdown of an associated episiotomy or episiorrectomy, or after failure of a previous repair.^[71]

Diagnosis. Perineal disorders, including abscesses and fistulas, may present with symptoms of gradual or sudden onset of vulvar pain, swelling, vulvovaginal irritation, malodorous discharge, and gas or fecal incontinence. Vulvar symptoms may be unilateral or bilateral. Patients should be questioned for other symptoms that may be associated with active IBD, including diarrhea and abdominal cramping, as well as extraintestinal symptoms that suggest systemic manifestations such as fever, joint pain, or weight loss.

The physical examination may reveal anorectal or vulvovaginal ulcerations or cellulitis. An abscess of the vulva may have the appearance of an abscess of a Bartholin's cyst, depending on its location. Biopsy of the affected area may be diagnostic for IBD with histologic features of a noncaseating giant cell granuloma; special stains and cultures for acid-fast bacilli and fungal elements should be obtained to exclude tuberculosis and fungal diseases. Office drainage of a fluctuant mass can be accomplished with local anesthesia, but excision of the affected area should not be attempted. If labial swelling is present without fluctuance, it is unlikely that a drainable collection is present; therefore, incision and attempted drainage should not be performed.

An abscess may be associated with fistula, or it may appear as a relatively limited area of erythema, with or without chronic drainage. The origin of the fistulous tract may not be immediately evident on examination. The site may be probed using a lacrimal duct probe or small-caliber cervical dilator. If it is difficult to identify the fistulous tract, one may attach a plastic angiocatheter (with the needle removed) to a small syringe of hydrogen peroxide, and inject while trying to thread the catheter into the fistula. If hydrogen peroxide bubbles from the rectum, the presence of a fistulous connection to the rectum will have been confirmed.

Treatment. It is necessary to treat the associated IBD to provide the best chance for long-term resolution of perineal disorders. Anti-inflammatory drugs are the mainstay of medical therapy for IBD. Options include sulfasalazine or topical 5-aminosalicylic acid administered as an enema, or steroids given orally, systemically, or locally as an enema.^[1] Immunosuppressive drugs such as mercaptopurine, azathioprine, and cyclosporine may also be useful.^[72] Metronidazole in high doses (20mg/kg per day) can be extremely effective in improving perineal disease, and should be maintained for at least 4 months, then tapered off and stopped.^[73,74] A small proportion of rectovaginal fistulas will resolve with medical management of bowel disease.

The surgical repair of rectovaginal fistulas in women with IBD can be accomplished in a variety of ways. Some superficial fistulas may resolve with fistulotomy, in which the fistula tract is incised without tissue reapproximation.^[75,76] When the bowel disease is quiescent, simple fistulas can be repaired primarily. This may be accomplished either transvaginally, with excision of the fistula tract and a layered closure,^[68,77] or transrectally, with advancement of rectal mucosa over the fistula.^[78-80] Complex fistulas may benefit from staged repair, with temporary intestinal diversion. Reversal should be delayed until healing has occurred.^[81,82] With recurrent fistulas, the use of gracilis myocutaneous flaps may increase the chance of successful repair by bringing in fresh tissue and blood supply.^[83,84] Proctectomy or proctocolectomy with permanent intestinal diversion may be necessary as definitive surgical therapy for recurrent fistulas, but even this may not be effective without coincident medical therapy.^[75] Overall, success rates for rectovaginal fistula repair average about 75%, ranging from 60% to 93%.^[68,75,77,78,81,82] A novel approach to fistula treatment uses autologous fibrin "glue" to seal the fistulous tract and aid in healing.^[85,86]

Vaginal discharge.Bothersome vaginal discharge occurs in up to 45% of women who have had surgery for IBD.^[7,16] Women may complain of extremely heavy vaginal discharge, especially discharge that leaks out of the vagina with sitting or standing, or malodorous discharge. After proctectomy or proctocolectomy, the orientation of the vagina becomes more posterior. Without the intervening rectum, the apex of the vagina may become fixed to the sacrum and coccyx, and vaginal secretions pool in the posterior vaginal fornices.^[16,87] Sjodahl and colleagues^[88] have described a procedure to correct this dorsocaudal dislocation of the vagina, or "horizontal vagina syndrome." The procedure, which is not in wide clinical use, involves the interposition of gluteus maximus muscle flaps between the posterior vagina and sacrum.

The bacteriology of the vagina in women with IBD has not been specifically studied, although Moody and colleagues^[89] reported that vaginal yeast infections occurred more commonly in women with Crohn's disease compared with a control group. Perhaps this is related to frequent courses of antibiotics, with or without steroid treatment. In women receiving these therapies, vaginal yeast may overgrow the normally predominant lactobacilli in the vaginal environment, or those lactobacilli may be replaced by enteric or other pathogenic bacteria.

Women should be instructed in vulvar hygiene, with emphasis on keeping the vulvar area as open and dry as possible and avoiding all potential irritants. Documented vaginal infections should be treated with the appropriate antimicrobials; if bacterial or yeast infections persist or recur frequently, long-term suppressive treatment may be considered. When pooling of vaginal secretions occurs, women can use intermittent vaginal douching for symptomatic relief.

Issues of sexuality. Sexual problems in women with IBD may be related to the disease process itself, the effect of surgical treatment, or both. Perineal fistulas or abscesses contribute to perineal pain with intercourse, particularly in women with Crohn's disease. An estimated 50% to 60% of women with IBD experience abdominal pain with intercourse.^[7,89] Another factor interfering with sexual activity is the sensation of rectal pressure and urgency during intercourse, and the fear or occurrence of fecal incontinence. These problems may be severe enough to lead to abstinence from sexual activity. In a study of women in stable relationships, 14 of 50 women (28%) with Crohn's disease were not sexually active, whereas only 2 of 50 control women (4%) without Crohn's disease reported not being sexually active.^[90] However, for women with either Crohn's disease or ulcerative colitis who continue to be sexually active, their frequency of intercourse does not differ from control groups of women without IBD.^[89,90]

As described above, proctectomy sometimes results in postoperative dislocation of the vagina, which may make it

difficult to have intercourse. Dyspareunia has been reported in at least 1% and as many as 38% of women after proctocolectomy.^[15,16,91-94] In some cases, the postoperative dyspareunia may be temporary. One study found that primary closure of the perineal wound, rather than healing by secondary intention, resulted in more rapid healing of the perineum, although breakdown of the perineal wound occurred in 50%.^[95] Proctocolectomy may also be associated with sexual dysfunction related to nerve disruption, particularly with more radical resections such as those performed in patients with rectal cancer. This is a well-recognized complication in men, although with improved nerve-sparing surgical techniques, the rate of permanent sexual dysfunction in men following proctocolectomy for benign disease is 3%.^[93] Sexual dysfunction may be more subtle in women. Two reports have suggested that no impairment in orgasmic ability is seen after proctocolectomy.^[15,93]

In addition to physical factors that may interfere with sexual function, there are psychological factors, such as loss of positive body image and embarrassment or shame associated with stomas.^[96,97] Women benefit from open discussions about sexuality, such as sharing their expectations and getting advice about changes after surgery.^[98] Many women experience enhanced sexual function after surgery, which is attributed to an overall improvement in health and well-being.^[15]

Fecal incontinence is common in women with IBD--in one series of women who had undergone surgery for IBD, the rate was 60%.^[7] Women should be specifically questioned about the occurrence of fecal incontinence, as they may be too embarrassed to volunteer this complaint. The mechanisms of fecal incontinence can include 1 or a combination of the following factors: diarrhea that overcomes the anal sphincters, incompetence of the anal sphincters due to destruction from the inflammatory process of the bowel disease, damage from previous surgery or childbirth injury, or rectovaginal fistulas.

Gynecologic Surgery

Abdominopelvic pain in women with IBD may be attributable to their bowel disease, to adhesions from previous surgical procedures, or to gynecologic conditions. While the same differential diagnoses should be considered as for any woman with acute or chronic pain, the way in which the spectrum of etiologies for pain differs in women with IBD is unclear.

Ovarian cysts. The prevalence of ovarian cysts may be somewhat higher in women with IBD; in one study, ovarian cysts were found in 3 of 61 (5%) women with Crohn's disease and in 5 of 64 (8%) women with ulcerative colitis, versus 2 of 100 (2%) controls.^[99] Especially in women who have had multiple previous abdominal surgeries related to IBD, the ovaries may become trapped in the retroperitoneum or surrounded by adhesions, leading to cyst formation.^[17,100] "Pseudocysts" may develop with the accumulation of fluid in peritoneal inclusion cysts.^[101-103] Rarely, the ovary becomes directly involved in the inflammatory process (oophoritis). The ovary may also be involved indirectly, with formation of an intestinal fistula.^[104,105]

There are no data to assist in making management decisions for women with apparent ovarian cysts. Considering the potential morbidity of surgery, a conservative approach is important. When an apparent ovarian cyst is discovered on an imaging study, clinical correlation is important. An asymptomatic, simple, fluid-filled cyst may be followed conservatively; if 2 imaging studies show stability of the cyst, then no further evaluation or treatment may be necessary. If initial ultrasound findings are equivocal or difficult to interpret, CT may provide useful additional information.^[106] Contrast opacification of bowel is necessary to distinguish thickened loops of bowel from a pelvic mass or abscess. If indicated, drainage of fluid-filled cysts may be accomplished with radiologic (ultrasound or CT scan) guidance.

Surgical approach. When surgery is necessary, most commonly because of pain or a mass suspicious for ovarian cancer, the choice of surgical approach can be problematic. Traditionally, women with multiple previous surgeries related to IBD would not be considered good candidates for laparoscopic surgery, due to the likelihood of dense adhesions and the risk of bowel injury. Recent studies concerning laparoscopic bowel surgery related to IBD found that the use of laparoscopy for intestinal resection or diversion was feasible.^[107,108] However, the risks and benefits of the laparoscopic approach, in addition to the surgeon's laparoscopic skill and experience, should be carefully weighed when deciding between laparotomy and laparoscopy. Under most circumstances, laparotomy is the recommended approach. All women should undergo mechanical bowel preparation before undergoing any surgery.

When hysterectomy is necessary, the choice of surgical approach again involves weighing relative risks and benefits. In women who have had a proctocolectomy, the upper vagina, cervix, and lower uterus may be adherent to the sacrum and coccyx. In this situation, excessive blood loss may occur if sacral veins are disrupted. Vaginal

hysterectomy should be performed when possible, to avoid such potential problems as morbidity inherent in an abdominal incision, disruption of an abdominal stoma, and the need for extensive lysis of adhesions to reach the pelvic organs. Adhesions encountered with vaginal hysterectomy can usually be lysed with less difficulty than those encountered with the abdominal approach. As discussed above, laparoscopic hysterectomy should probably be avoided in women who have undergone multiple abdominal surgeries related to IBD.

Hysterectomy with or without oophorectomy may be performed at laparotomy; it may also be combined with different bowel procedures performed to treat manifestations of the bowel disease, such as proctocolectomy with pelvic pouch or ileo-anal anastomosis. When adhesions are encountered at laparotomy, exposure to the pelvis may be gained by dissection of the bowel "en masse" from the uterus and pelvic side walls, and avoiding lysis of adhesions between bowel loops. Once the bowel is freed from the pelvis, the ureters should be identified by retroperitoneal dissection.

Fertility

The literature is somewhat contradictory regarding fertility in women with IBD. Initial reports suggested that women with ulcerative colitis were subfertile,^[109,110] although more recently it has been stated that fertility is not affected by ulcerative colitis.^[111,112] Most agree that women with Crohn's disease experience higher rates of infertility and subfertility than women without IBD.^[113] Infertility may be related to 1 or more of the following factors: tubal blockage from the bowel disease or previous surgery, ovarian dysfunction with anovulation or oligo-ovulation, or decreased sexual activity. In the past, women with IBD may have been advised to avoid pregnancy, but current recommendations are less restrictive. There is little evidence to suggest that pregnancy has a consistent effect on the course of IBD. When possible, conception during remission is preferable, since active disease at conception may increase the risk of spontaneous abortion. In general, medical therapy may be used as in nonpregnant women.^[112,114-116]

Routine Gynecologic Care

In children with IBD, particularly Crohn's disease, growth may be impaired, and puberty may be delayed if disease remission is not achieved.^[117] Growth restriction may be the first or only manifestation of IBD in children, so testing, including a complete blood count, erythrocyte sedimentation rate, and serum folate, should be performed if a growth problem is suspected. Anal, perirectal, and vulvar manifestations of Crohn's disease frequently predate the development of bowel symptoms and the diagnosis of IBD in children; therefore, a high index of suspicion must be maintained in children with vulvar disease.^[56,60]

For all women of reproductive age, regular gynecologic examinations are essential for health maintenance and screening. This is even more imperative for women with IBD. All sexually active women should receive appropriate counseling about and screening for sexually transmitted disease. Women should also receive regular Pap smear screening for cervical cancer.

Management of menopause is the same for women with IBD as for women without this disorder. Hormone therapy can be offered to all women who do not have specific contraindications, such as active liver disease. The risk of thrombotic events is not increased in women on menopausal hormone therapy, since the dose of estrogen is so low. Women with a history of menstrual abnormalities, or those who have received steroid treatment for their bowel disease, may be at especially high risk for osteoporosis. Bone densitometry can be performed to provide a baseline bone mass measurement, and therapy planned accordingly.

Contraception. Even in women with subfertility due to IBD, particularly Crohn's disease, the need for contraception should not be neglected. Reversible methods of birth control are available to women with IBD. OCPs have already been discussed in the context of treatment for menstrual abnormalities; obviously, the use of OCPs will also provide effective contraception. Long-acting progestins (either medroxyprogesterone acetate 150mg given as an intramuscular injection every 12 weeks or subdermal implants of sustained-release levonorgestrel, which last up to 5 years) are very effective. Their most common side effect is irregular bleeding. The intrauterine device (IUD) provides highly effective contraception and is associated with a very low risk of pelvic infection in women who are at low risk for sexually transmitted infections. The risk of infection associated with IUDs in women with IBD has not been specifically studied; it is possible that the risk may be higher in women with active pelvic infection due to IBD. Two IUDs are currently available in the US; the copper-containing IUD is effective for up to 10 years, while the progesterone-releasing IUD requires yearly removal and replacement.

In general, barrier methods are less effective in preventing pregnancy than hormonal methods or intrauterine devices. However, when used consistently and correctly by motivated couples, the effectiveness of condoms with vaginal spermicide is about 90%. In women who have alterations in vaginal anatomy after proctocolectomy, a diaphragm may not be a good choice as a proper fit may not be possible.

Couples who have completed their families may request sterilization as a permanent method of birth control. Consideration should be given to vasectomy for the man, to avoid the need for surgery in the woman. When the woman is sterilized, laparoscopy should probably not be attempted if she has had multiple surgical procedures. In these women, sterilization may easily be performed at the time of laparotomy for bowel indications. It is not known if the effectiveness of sterilization is any different in women with IBD. The long-term failure rate of sterilization by tubal interruption is about 2%, with a relatively higher failure rate in younger women.^[118]

Summary

Gynecologic disorders occur commonly in women with Crohn's disease, ulcerative colitis, and other forms of IBD. For optimal evaluation and treatment, all health care professionals who treat women with IBD should be aware of the spectrum of gynecologic conditions that may be encountered. Menstrual disorders are common and are associated with pain and other symptoms that may overlap with those related to IBD. The diagnosis of perineal disorders, including fistulas and abscesses, requires a high degree of suspicion for IBD. Women with IBD frequently have sexual problems, due to the disease itself, surgical treatment, or both, and they may benefit from appropriate evaluation and treatment. Gynecologic surgery presents many challenges in women with IBD.

Editorial Comment: Gynecologic Complications Can Be Crippling With Crohn's

I congratulate Dr. Weber and Dr. Belinson for their organized approach to the gynecological disorders that may either accompany or complicate inflammatory bowel disease (IBD). While there is extensive literature on the interrelationship between IBD and pregnancy, there is little on problems affecting the vagina, uterus, and ovaries in the nonpregnant woman with Crohn's disease and ulcerative colitis. Unfortunately, neither obstetricians/gynecologists nor gastroenterologists have sufficient data from controlled trials from which to draw conclusions. Nevertheless, experienced clinicians in both disciplines have provided us with many consistent observations over the past 50 years. From a gastroenterologic perspective, I would have preferred the title, "Gynecologic Disorders Complicating Inflammatory Bowel Disease." It is reasonable to anticipate that gynecologic disorders will arise in association with IBD, given the fact that there are about 2 million people with IBD in the US.

In menstruating women with ulcerative colitis, the most challenging symptom complex seen by the gastroenterologist is diarrhea that recurs or worsens during or just prior to the menstrual period. This has not been demonstrated to correlate with endoscopic evidence of active colitis in most cases, and it does not seem to be prevented by maintenance medications used in treatment. Occasionally, the symptoms are sufficiently severe to warrant administration of oral steroids during the time of the menstrual period, usually leading to alleviation of symptoms.

In Crohn's disease, gynecologic complications are far more crippling both physically and emotionally. One characteristic of Crohn's disease is the fistula, an abnormal channel arising from the primary inflammatory process in the bowel and burrowing in many possible directions, encompassing another bowel or intestine, the urinary bladder, and the skin. Most of these fistulas originate in the distal small bowel or ileum, but one of the more common ones -- the rectovaginal fistula -- passes from rectum to vagina. Other Crohn's disease fistulas do not originate in the bowel itself but begin as abscesses in the vicinity of the rectum. These perirectal or perianal abscesses present on the skin of the perineum (between vagina and rectum), on the vaginal labia, and within the rectum or vagina. These abscesses and fistulas are responsible for pain, mild to incapacitating diarrhea, and sometimes passage of fecal content from the bowel. These perirectal abscesses and fistulas can be treated surgically and will provide temporary relief. Unfortunately, the relief is rarely of long duration without treatment of the underlying Crohn's disease.

Drug therapy of Crohn's disease seems to reduce inflammation, but very few of the available drugs have favorable effects against fistulas. As indicated by Dr. Weber and Dr. Belinson, metronidazole has been effective for these complications, but unfortunately, adequate dose usually causes a neuritis and necessitates reduction or discontinuation of the drug. Furthermore, metronidazole cannot be used during pregnancy because of its toxicity to the fetus. The only maintenance medications shown to heal fistulas and keep them closed are the immunosuppressives. For oral maintenance therapy, these include mercaptopurine and azathioprine. Fortunately, these drugs are well tolerated by most patients, but they also require monitoring of the whole blood count.

I would like to emphasize one final point made by the authors. The nonsteroidal anti-inflammatory drugs (NSAIDs) have been shown to aggravate existing ulcerative colitis and Crohn's disease. In fact, the onset of either disease often coincides with their use. Therefore these drugs -- which include aspirin, ibuprofen, and naproxen -- often used for menstrual pain, should be avoided by patients with IBD.

Burton I. Korelitz, MD
 Chief, Section of Gastroenterology
 Lenox Hill Hospital
 New York, N. Y.
 Clinical Professor of Medicine
 New York University School of Medicine
 New York, N. Y.

References

1. Podolsky DK: Inflammatory bowel disease. *N Engl J Med* 325:928-937, 1008-1016, 1991.
2. Vessey M, Jewell D, Smith A, et al: Chronic inflammatory bowel disease, cigarette smoking, and use of oral contraceptives: Findings in a large cohort study of women of childbearing age. *Br Med J* 292:1101-1103, 1986.
3. Logan RFA, Kay CR: Oral contraception, smoking and inflammatory bowel disease--Findings in the Royal College of General Practitioners Oral Contraception Study. *Int J Epidemiol* 18:105-107, 1989.
4. Mayberry JF, Ballantyne KC, Hardcastle JD, et al: Epidemiological study of asymptomatic inflammatory bowel disease: The identification of cases during a screening programme for colorectal cancer. *Gut* 30:481-483, 1989.
5. Calkins BM: A meta-analysis of the role of smoking in inflammatory bowel disease. *Dig Dis Sci* 34:1841-1854, 1989.
6. Donaldson LB: Crohn's disease: Its gynecologic aspect. *Am J Obstet Gynecol* 131:196-202, 1978.
7. Weber AM, Ziegler C, Belinson JL, et al: Gynecologic history in women with inflammatory bowel disease. *Obstet Gynecol* 86:843-847, 1995.
8. Rees WDW, Rhodes J: Altered bowel habit and menstruation. *Lancet* 2:475, 1976.
9. Heitkemper MM, Shaver JF, Mitchell ES: Gastrointestinal symptoms and bowel patterns across the menstrual cycle in dysmenorrhea. *Nurs Res* 37:108-113, 1988.
10. Wald A, van Thiel DH, Hoehstetter L, et al: Gastrointestinal transit: The effect of the menstrual cycle. *Gastroenterology* 80:1497-1500, 1981.
11. Davies GJ, Crowder M, Reid B, et al: Bowel function measurements of individuals with different eating patterns. *Gut* 27:164-169, 1986.
12. Turnbull GK, Thompson DG, Day S, et al: Relationships between symptoms, menstrual cycle and orocaecal transit in normal and constipated women. *Gut* 30:30-34, 1989.
13. Kamm MA, Farthing MJG, Lennard-Jones JE: Bowel function and transit rate during the menstrual cycle. *Gut* 30:605-608, 1989.
14. Hinds JP, Stoney B, Wald A: Does gender or the menstrual cycle affect colonic transit? *Am J Gastroenterol* 84:123-126, 1989.
15. Metcalf AM, Dozois RR, Kelly KA: Sexual function in women after proctocolectomy. *Ann Surg* 204:624-627, 1986.
16. Wikland M, Jansson I, Asztely M, et al: Gynaecological problems related to anatomical changes after conventional proctocolectomy and ileostomy. *Int J Colorect Dis* 5:49-52, 1990.
17. Counihan TC, Roberts PL, Schoetz DJ, et al: Fertility and sexuality and gynecologic function after ileal pouch-anal anastomosis. *Dis Colon Rectum* 37:1126-1129, 1994.
18. Harty RF, Kaude JV: Invasive endometriosis of the terminal ileum: A cause of small bowel obstruction of obscure origin. *South Med J* 76:253-255, 1983.
19. Cappell MS, Friedman D, Mikhail N: Endometriosis of the terminal ileum simulating the clinical, roentgenographic, and surgical findings in Crohn's disease. *Am J Gastroenterol* 86:1057-1062, 1991.
20. Minocha A, Davis MS, Wright RA: Small bowel endometriosis masquerading as regional enteritis. *Dig Dis Sci* 39:1126-1133, 1994.
21. Langlois NE, Park KG, Keenan RA: Mucosal changes in the large bowel with endometriosis: A possible cause of misdiagnosis of colitis? *Hum Pathol* 25: 1030-1034, 1994.
22. Kilpatrick ZM, Silverman JF, Betancourt E, et al: Vascular occlusion of the colon and oral contraceptives--Possible relation. *N Engl J Med* 278:438-440, 1968.
23. Hurwitz RL, Martin AJ, Grossman BE, et al: Oral contraceptives and gastrointestinal disorders. *Ann Surg* 172:892-896, 1970.
24. Cotton PB, Thomas ML: Ischaemic colitis and the contraceptive pill. *Br Med J* 3: 27-28, 1971.

25. Morowitz DA, Epstein BH: Spectrum of bowel disease associated with use of oral contraceptives. *Med Ann Dist Colum* 42:6-10, 1973.
26. Bernardino ME, Lawson TL: Discrete colonic ulcers associated with oral contraceptives. *Dig Dis* 21:503-506, 1976.
27. Bonfils S, Hervoir P, Girodet J, et al: Acute spontaneously recovering ulcerating colitis (ARUC)--Report of 6 cases. *Dig Dis* 22: 429-436, 1977.
28. Camilleri M, Schafier K, Chadwick VS, et al: Periportal sinusoidal dilatation, inflammatory bowel disease, and the contraceptive pill. *Gastroenterology* 80:810-815, 1981.
29. Tedesco FJ, Volpicelli NA, Moore FS: Estrogen- and progesterone-associated colitis: A disorder with clinical and endoscopic features mimicking Crohn's colitis. *Gastrointest Endosc* 28:247-249, 1982.
30. Bottiger LE, Boman G, Eklund G, et al: Oral contraceptives and thromboembolic disease: Effects of lowering estrogen content. *Lancet* 1:2097-2101, 1980.
31. Wakefield AJ, Sawyerr AM, Dhillon AP, et al: Pathogenesis of Crohn's disease: Multifocal gastrointestinal infarction. *Lancet* 1:1057-1062, 1989.
32. Wakefield AJ, Sawyerr AM, Hudson M, et al: Smoking, the oral contraceptive pill, and Crohn's disease. *Dig Dis Sci* 36:1147-1150, 1991.
33. Lashner BA, Kane SV, Hanauer SB: Lack of association between oral contraceptive use and Crohn's disease: A community-based matched case-control study. *Gastroenterology* 97:1442-1447, 1989.
34. Lashner BA, Kane SV, Hanauer SB: Lack of association between oral contraceptive use and ulcerative colitis. *Gastroenterology* 99:1032-1036, 1990.
35. Persson PG, Leijonmarck CE, Bernell O, et al: Risk indicators for inflammatory bowel disease. *Int J Epidemiol* 22:268-272, 1993.
36. Lesko SM, Kaufman DW, Rosenberg L, et al: Evidence for an increased risk of Crohn's disease in oral contraceptive users. *Gastroenterology* 89:1046-1049, 1985.
37. Sandler RS, Wurzelmann JI, Lyles CM: Oral contraceptive use and the risk of inflammatory bowel disease. *Epidemiology* 3:374-378, 1992.
38. Katschinski B, Fingerle D, Scherbaum B, et al: Oral contraceptive use and cigarette smoking in Crohn's disease. *Dig Dis Sci* 38:1596-1600, 1993.
39. Boyko EJ, Theis MK, Vaughan TL, et al: Increased risk of inflammatory bowel disease associated with oral contraceptive use. *Am J Epidemiol* 140:268-278, 1994.
40. Sutherland LR, Ramcharan S, Bryant H, et al: Effect of oral contraceptive use on reoperation following surgery for Crohn's disease. *Dig Dis Sci* 37:1377-1382, 1992.
41. Carlson KJ, Nichols DH, Schiff I: Indications for hysterectomy. *N Engl J Med* 328:856-860, 1993.
42. Scully RE, Mark EJ, McNeely WF, et al: Case records of the Massachusetts General Hospital, case 26-1989. *N Engl J Med* 320:1741-1747, 1989.
43. Parks AG, Morson BC, Pegum JS: Crohn's disease with cutaneous involvement. *P R Soc Med* 58:241-242, 1965.
44. McCallum DI, Kirmont PC: Dermatological manifestations of Crohn's disease. *Br J Dermatol* 80:1-8, 1968.
45. Mountain JC: Cutaneous ulceration in Crohn's disease. *Gut* 11:18-26, 1970.
46. Ansell ID, Hogbin B: Crohn's disease of the vulva. *J Obstet Gynaecol Br Commonw* 80:376-378, 1973.
47. Kao MS, Paulson JD, Askin FB: Crohn's disease of the vulva. *Obstet Gynecol* 46:329-333, 1975.
48. Levine N, Bangert J: Cutaneous granulomatosis in Crohn's disease. *Arch Dermatol* 118:1006-1009, 1982.
49. Kremer M, Nussenson E, Steinfeld M, et al: Crohn's disease of the vulva. *Am J Gastroenterol* 79:376-378, 1984.
50. Lavery HA, Pinkerton JM, Sloan J: Crohn's disease of the vulva--Two further cases. *Br J Dermatol* 113:359-363, 1985.
51. Reyman L, Milano A, Demopoulos R, et al: Metastatic vulvar ulceration in Crohn's disease. *Am J Gastroenterol* 81:46-49, 1986.
52. Schulman D, Beck LS, Roberts IM, et al: Crohn's disease of the vulva. *Am J Gastroenterol* 82:1328-1330, 1987.
53. Baker VV, Walton LA: Crohn's disease of the vulva. *South Med J* 81:285-286, 1988.
54. Duhra P, Paul CJ: Metastatic Crohn's disease responding to metronidazole. *Br J Dermatol* 119:87-91, 1988.
55. Holohan M, Coughlan M, O'Loughlin S, et al: Crohn's disease of the vulva--Case report. *Br J Obstet Gynaecol* 95:943-945, 1988.
56. Lally MR, Orenstein SR, Cohen BA: Crohn's disease of the vulva in an 8 year old girl. *Pediatr Derm* 5:103-106, 1988.
57. Patton LW, Elgart ML, Williams CM: Vulvar erythema and induration: Extraintestinal Crohn's disease of the vulva. *Arch Dermatol* 126:1351-1355, 1990.
58. Kingsland CR, Alderman B: Crohn's disease of the vulva. *J R Soc Med* 84:236-237, 1991.
59. Kim NI, Eom JY, Sim WY, et al: Crohn's disease of the vulva. *J Am Acad Dermatol* 27:764-765, 1992.
60. Werlin SL, Esterly NB, Oechler H: Crohn's disease presenting as unilateral labial hypertrophy. *J Am Acad Dermatol* 27:893-895, 1992.

61. Shen RN, Cybulska BA, Thin RN, et al: Vulval Crohn's disease mimicking genital herpes. *Int J STD & AIDS* 4:54-56, 1993.
62. Virgili A, Corazza M: Crohn's disease of the vulva: A case report. *J Reprod Med* 39:115-117, 1994.
63. Vettriano IM, Merritt DF: Crohn's disease of the vulva. *Am J Dermatopath* 17:410-413, 1995.
64. Samitz MW: Skin complications of ulcerative colitis and Crohn's disease. *Cutis* 12:533-537, 1973.
65. Handfield-Jones SE, Prendiveille WJ, Norman S: Vulval lymphangiectasia. *Genitourin Med* 65:335-337, 1989.
66. Ostlere LS, Langtry JA, Mortimer PS, et al: Hidradenitis suppurativa in Crohn's disease. *Br J Dermatol* 125:384-386, 1991.
67. Church JM, Fazio VW, Lavery IC, et al: The differential diagnosis and comorbidity of hidradenitis suppurativa and perianal Crohn's disease. *Int J Colorect Dis* 8:117-119, 1993.
68. Ritchie JK, Lennard-Jones JE: Crohn's disease of the distal large bowel. *Scand J Gastroenterol* 11:433-436, 1976.
69. Bandy LC, Addison A, Parker RT: Surgical management of rectovaginal fistulas in Crohn's disease. *Am J Obstet Gynecol* 147:359-363, 1983.
70. Harms BA, Hamilton JW, Starling JR: Management of chronic ulcerative colitis and rectovaginal fistula by simultaneous ileal pouch construction and fistula closure. *Dis Colon Rectum* 30:611-614, 1987.
71. Holland RM, Greiss FC: Perineal Crohn's disease. *Obstet Gynecol* 62:527-529, 1983.
72. Hanauer SB, Smith MB: Rapid closure of Crohn's disease fistulas with continuous cyclosporin A. *Am J Gastroenterol* 88:646-649, 1993.
73. Bernstein LH, Frank MS, Brandt LJ, et al: Healing of perineal Crohn's disease with metronidazole. *Gastroenterology* 79:357-365, 1980.
74. Brandt LJ, Bernstein LG, Boley SJ, et al: Metronidazole therapy for perineal Crohn's disease: A follow-up study. *Gastroenterology* 83:383-387, 1982.
75. Radcliffe AG, Ritchie JK, Hawley PR, et al: Anovaginal and rectovaginal fistulas in Crohn's disease. *Dis Colon Rectum* 31:94-99, 1988.
76. Francois Y, Descos L, Vignal J: Conservative treatment of low rectovaginal fistula in Crohn's disease. *Int J Colorect Dis* 5:12-14, 1990.
77. Sher ME, Bauer JJ, Gelernt I: Surgical repair of rectovaginal fistulas in patients with Crohn's disease: Transvaginal approach. *Dis Colon Rectum* 34:641-648, 1991.
78. Jones IT, Fazio VW, Jagelman DG: The use of transanal rectal advancement flaps in the management of fistulas involving the anorectum. *Dis Colon Rectum* 30:919-923, 1987.
79. Hesterberg R, Schmidt WU, Muller F, et al: Treatment of anovaginal fistulas with an anocutaneous flap in patients with Crohn's disease. *Int J Colorect Dis* 8:51-54, 1993.
80. Makowiec F, Jehle EC, Becker HD, et al: Clinical course after transanal advancement flap repair of perianal fistula in patients with Crohn's disease. *Br J Surg* 82:603-606, 1995.
81. Cohen JL, Stricker JW, Schoetz DJ, et al: Rectovaginal fistula in Crohn's disease. *Dis Colon Rectum* 32:825-828, 1989.
82. Morrison JG, Gathright JB, Ray JE, et al: Results of operation for rectovaginal fistula in Crohn's disease. *Dis Colon Rectum* 32:497-499, 1989.
83. Ward MW, Morgan BG, Clark CG: Treatment of persistent perineal sinus with vaginal fistula following proctocolectomy for Crohn's disease. *Br J Surg* 69:228-229, 1982.
84. Gorenstein L, Boyd JB, Ross TM: Gracilis muscle repair of rectovaginal fistula after restorative proctocolectomy: Report of two cases. *Dis Colon Rectum* 31:730-734, 1988.
85. Kirkegaard P, Madsen PV: Perineal sinus after removal of the rectum--Occlusion with fibrin adhesive. *Am J Surg* 145:791-794, 1983.
86. Abel ME, Chiu YS, Russell TR, et al: Autologous fibrin glue in the treatment of rectovaginal and complex fistulas. *Dis Colon Rectum* 36:447-449, 1993.
87. Asztely M, Palmblad S, Wikland M, et al: Radiological study of changes in the pelvis in women following proctocolectomy. *Int J Colorect Dis* 6:103-107, 1991.
88. Sjodahl R, Nystrom PO, Olaison G: Surgical treatment of dorsocaudal dislocation of the vagina after excision of the rectum: The Kylberg operation. *Dis Colon Rectum* 33:762-764, 1990.
89. Moody G, Probert CJ, Srivastava EM, et al: Sexual dysfunction amongst women with Crohn's disease: A hidden problem. *Digestion* 52:179-183, 1992.
90. Moody GA, Mayberry JF: Perceived sexual dysfunction amongst patients with inflammatory bowel disease. *Digestion* 54:256-260, 1993.
91. Gruner ON, Naas R, Fretheim B, et al: Marital status and sexual adjustment after colectomy: Results in 178 patients operated on for ulcerative colitis. *Scand J Gastroenterol* 12:193-197, 1977.
92. Fath S, Filipsson S, Hellberg R, et al: Sexual dysfunction following proctocolectomy. *Ann Chirurg Gynaecol* 67:8-12, 1978.
93. Bauer JJ, Gelernt IM, Salky B, et al: Sexual dysfunction following proctocolectomy for benign disease of the colon and rectum. *Ann Surg* 197:363-367, 1983.
94. Sjogren B, Poppen B: Sexual life in women after colectomy-proctomucosectomy with S-pouch. *Acta Obstet*

- Gynecol Scand 74:51-55, 1995.
95. Leicester RJ, Ritchie JK, Wadsworth J, et al: Sexual function and perineal wound healing after intersphincteric excision of the rectum for inflammatory bowel disease. *Dis Colon Rectum* 27:244-248, 1984.
 96. Burnham WR, Lennard-Jones JE, Brooke BN: Sexual problems among married ileostomists: Survey conducted by the Ileostomy Association of Great Britain and Ireland. *Gut* 18:673-677, 1977.
 97. Rolstad BS, Wilson G, Rothenberger DA: Sexual concerns in the patient with an ileostomy. *Dis Colon Rectum* 26:170-171, 1983.
 98. Brouillette JN, Pryor E, Fox TA: Evaluation of sexual dysfunction in the female following rectal resection and intestinal stoma. *Dis Colon Rectum* 24:96-102, 1981.
 99. Nissen KR, Lenz S, Sorensen SS, et al: Ovarian cysts in women with inflammatory bowel disease. *Acta Obstet Gynecol Scand* 67:237-240, 1988.
 100. Matthews JM, Kodner IJ, Fry RD, et al: Entrapped ovary syndrome. *Dis Colon Rectum* 29:341-343, 1986.
 101. Gussman D, Thickman D, Wheeler JE: Postoperative peritoneal cysts. *Obstet Gynecol* 68:53S-55S, 1986.
 102. Hoffer FA, Kozakewich H, Colodny A, et al: Peritoneal inclusion cysts: Ovarian fluid in peritoneal adhesions. *Radiology* 169:189-191, 1988.
 103. Ross MJ, Welch WR, Scully RE: Multilocular peritoneal inclusion cysts (so-called cystic mesotheliomas). *Cancer* 64:1336-1346, 1989.
 104. Frost SS, Elstein MP, Latour F, et al: Crohn's disease of the mouth and ovary. *Dig Dis Sci* 26:568-571, 1981.
 105. Honore LH: Combined suppurative and noncaseating granulomatous oophoritis associated with distal ileitis (Crohn's disease). *Eur J Obstet Gynecol Reprod Biol* 12:91-94, 1981.
 106. Langer JE, Dinsmore BJ: Computed tomographic evaluation of benign and inflammatory disorders of the female pelvis. *Radiol Clin North Am* 30:831-842, 1992.
 107. Ludwig KA, Milsom JW, Church JM, et al: Preliminary experience with laparoscopic intestinal surgery for Crohn's disease. *Am J Surg* 171:52-55, 1996.
 108. Reissman P, Salky BA, Pfeifer J, et al: Laparoscopic surgery in the management of inflammatory bowel disease. *Am J Surg* 171:47-50, 1996.
 109. Banks BM, Korelitz BI, Zetzel L: The course of non-specific ulcerative colitis: Review of twenty years' experience and late results. *Gastroenterology* 32:983-1012, 1980.
 110. DeDombal RT, Watts JM, Watkinson G, et al: Ulcerative colitis and pregnancy. *Lancet* 2:599-602, 1965.
 111. Willoughby CP, Truelove SC: Ulcerative colitis and pregnancy. *Gut* 21:469-474, 1980.
 112. Hanan IM: Inflammatory bowel disease in the pregnant woman. *Compr Ther* 19:91-95, 1993.
 113. Mayberry JF, Weterman IT: European survey of fertility and pregnancy in women with Crohn's disease: A case control study by European collaborative group. *Gut* 27:821-825, 1986.
 114. Vender RJ, Spiro HM: Inflammatory bowel disease and pregnancy. *J Clin Gastroenterol* 4:231-249, 1982.
 115. Korelitz BI: Pregnancy, fertility and inflammatory bowel disease. *Am J Gastroenterol* 80:365-370, 1985.
 116. Miller JP: Inflammatory bowel disease in pregnancy: A review. *J R Soc Med* 79:221-225, 1986.
 117. Brain CE, Savage MO: Growth and puberty in chronic inflammatory bowel disease. *Bailliere's Clin Gastroenterol* 8:83-100, 1994.
 118. Peterson HB, Xia Z, Hughes JM, et al: The risk of pregnancy after tubal sterilization: Findings from the U.S. Collaborative Review of Sterilization. *Am J Obstet Gynecol* 174:1161-1168, 1996.

Dr. Weber is Staff Gynecologist and Head of Research, and **Dr. Belinson** is Chairman for the Department of Gynecology and Obstetrics at the Cleveland Clinic Foundation, Cleveland, Ohio.

Weber AM, Belinson JL. Inflammatory Bowel Disease--A Complicating Factor in Gynecologic Disorders? *MedGenMed* 1(2), 1999. [formerly published in *Medscape Women's Health eJournal* 2(1), 1997]. Available at: <http://www.medscape.com/viewarticle/408847>.
