

Endometriosis

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WHAT IS ENDOMETRIOSIS?

Endometriosis is a common gynecological condition. It was described in medical literature more than 300 years ago and has since been recognized as a chronic, painful, and often progressive disease in women. The causes of endometriosis are unknown.

Endometrial Implants

Endometriosis. Endometriosis occurs when cells from the mucus membrane lining the uterus (*endometrium*) form implants that attach, grow, and function *outside* the uterus, generally in the pelvic region. [*See Box* The Female Reproductive System.] Endometrial implants consist of both following cell types:

- Gland cells. These cells secrete hormones and other fluids and are normally located in the uterine lining.
- Stroma cells. These are the framework cells that build supportive tissue.

Endometrial cells contain receptors that bind to estrogen and progesterone, which promote uterine growth and thickening. During endometriosis these cells become implanted in organs and structures outside the uterus, where these hormonal activities continue to occur, causing bleeding and scarring.

Endometrial implants vary widely in size, shape, and color. Over the years, they may diminish in size or disappear or they may grow.

- Early implants are usually very small and look like clear pimples.
- If they continue to grow they may form flat injured areas (lesions), small nodules, or cysts called *endometriomas* , which can range from sizes smaller than a pea to larger than a grapefruit.
- Implants also vary in color; they may be colorless, red, or very dark brown. These so-called chocolate cysts are endometriomas filled with thick, old, dark brown blood that usually appear on the ovaries.

Location of Implants

Implants can form in many areas, most commonly in the following:

- The *peritoneum* . This is the smooth surface lining that covers the entire wall of the abdomen and folds over inner organs in the pelvic area.
- On or next to the ovaries.

Less commonly they occur in other areas:

- The cul-de-sac, an area between the uterus and rectum.
- The connective tissue that supports the uterus (called the uterosacral ligaments).
- The vagina.

- Fallopian tube.
- In the urinary tract (in about 20% of cases, usually without causing symptoms).
- In the gastrointestinal tract (in between 12% and 37% of patients).

Very rarely, they have been reported in areas far from the pelvis, including the lungs and even the arms and thighs.

Process of Endometriosis

The process of endometriosis mimics menstruation at certain stages:

- Each month, the exiled endometrial implants respond to the monthly cycle just as they would in the uterus: they fill with blood, thicken, break down and bleed.
- Products of the endometrial process cannot be shed through the vagina as menstrual blood and debris does. Instead, the implants develop into collections of blood that form cysts, spots, or patches.
- Lesions may grow or reseed as the cycle continues.

They are not cancerous, but they can develop to the point that they cause obstruction or adhesions (web-like scar tissue) that attach to nearby organs, causing pain, inflammation, and sometimes infertility.

The Female Reproductive System

Reproductive Organs

- The **uterus** is a pear-shaped organ located between the bladder and lower intestine. It consists of two parts: the body and the cervix. Normally, the **body** of the uterus is about the size of a fist, with its walls collapsed and flattened against each other. During pregnancy the walls of the uterus are pushed apart as the fetus grows.
- The **cervix** is the lower third of the uterus. It has a canal opening into the vagina with an opening called the **os**, which allows menstrual blood to flow out of the uterus into the vagina.
- **Fallopian tubes** lead off each side of the body of the uterus. Near the end of each tube is an ovary.
- **Ovaries** are egg-producing organs that hold between 200,000 and 400,000 **follicles** (from folliculus, meaning "sack" in Latin). These cellular sacks contain the materials needed to produce ripened eggs, or ova.
- The **endometrium** is the inner lining of the uterus. During pregnancy it thickens and becomes enriched with blood vessels to house and support the growing fetus. If pregnancy does not occur, the endometrium is shed as part of the menstrual flow. Menstrual flow also consists of blood and mucus from the cervix and vagina.

Reproductive Hormones

The pituitary gland is often referred to as the **master gland** because of its important role in many vital functions, many of which require hormones. In women, six key hormones serve as chemical messengers that regulate the reproductive system.

- The hypothalamus first releases the gonadotropin-releasing hormone (GnRH).
- This chemical, in turn, stimulates the pituitary gland to produce follicle-stimulating hormone (FSH) and luteinizing hormone (LH).
- Estrogen, progesterone, and the male hormone testosterone are secreted by the ovaries at the command of FSH and LH and complete the hormonal group necessary for reproductive health.

WHAT CAUSES ENDOMETRIOSIS?

In spite of the high prevalence of endometriosis in women all over the world, researchers have been unable to determine its cause. A combination of genetic, biologic, and environmental factors appear to work together to trigger the initial process, to produce implantation, and to trigger subsequent reseeded and spreading of the implants.

Initial Cause and Distribution of Endometriosis

Some evidence suggests that the causes of endometriosis may differ depending on the location of the implants. For example, in one study women with endometriosis in the abdominal region (the *peritoneum*) had elevated levels of leptin, a hormone associated with fat storage. Women with endometriosis in the ovaries had normal leptin levels. The study suggests that peritoneal endometriosis may result from a different biochemical process than ovarian endometriosis.

Retrograde Menstruation. One favored explanation for the development of endometriosis implants involves retrograde menstruation. This occurs when, during a woman's period, menstrual tissue flows backward through the fallopian tubes, rather than flowing out through the vagina. Early theorists suggested that in some cases, the redistributed uterine tissue attached and grew in areas outside the uterus, forming endometriosis implants. This theory does not fully explain endometriosis, however. Nearly all women experience some retrograde menstruation, but not all of them develop endometrial cysts. Consequently, other factors must be at work to explain why uterine tissue becomes implanted and grows in areas outside the uterus.

Lymphatic Transport. It has been suggested that endometriosis first develops when uterine tissue is separated and then is transported to other organs by way of the lymphatic system or the blood stream.

Environmental Toxins. Other suspects for causing initial development of endometriosis are chemicals called organochlorine, which include dioxins (such as PCBs and furans). These chemicals have estrogen-like effects and are widely found in pesticides and other common products. The organochlorines have a particularly powerful impact on the ovary, and one study observed that animals exposed to some of these chemicals develop spontaneous endometriosis. Organochlorines have been associated with infertility, certain reproductive cancers, and autoimmune disorders, conditions that also occur with higher frequency in women with endometriosis.

Candida. There is absolutely no evidence that endometriosis is caused by candida (commonly called yeast infection), as claimed in some consumer publications.

Causes of Persistence and Growth of Endometriosis

There are two basic mysteries surrounding the persistence and growth of endometriosis:

- Why do endometrial implants survive the attack by the immune system, which is typically

launched against any foreign presence in the body?

- How do these endometrial travelers develop new blood vessels and implant themselves in other locations?

Impaired Immune System. Some research is focused on possible immune disorders in women with endometriosis. One theory proposes that women with endometriosis have fewer natural killer (NK) cells, which are factors in the immune system important for surveillance. In their absence, the immune system is weakened and may allow endometrial tissue to invade and take root.

Growth Factors and Angiogenesis. Macrophages also produce growth factors, which are of particular interest because they play important roles in *angiogenesis*, a natural process by which new blood vessels form.

Vascular endothelial growth factor (VEGF) is secreted by endometrial cells, and so is of special interest. Under normal conditions, VEGF is secreted within the uterus. When oxygen levels drop following menstruation and blood loss, VEGF levels rise and promote the growth of new blood vessels. This process is important for repairing the uterus following menstruation.

When endometrial cells land outside the uterus, however, investigators theorize that this same process occurs with unfortunate results. The cells secrete VEGF when they are deprived of blood and oxygen, which in turn stimulates blood vessel growth. In this case, however, blood vessel growth serves to promote implantation outside the womb.

Other growth factors involved in angiogenesis that may play a role in endometriosis include transforming growth factors (such as TGF-beta), platelet-derived endothelial growth factor (PD-ECGF), and tumor necrosis growth factors.

Inflammatory Response. The damage, infertility, and pain produced by endometriosis may be due to an over-active response by the immune system to the early presence of endometrial implants. The body, perceiving the implants as hostile launches an attack. Of particular note, levels of large white blood cells called macrophages are elevated in endometriosis. Macrophages produce very potent factors, which include *cytokines* (particularly those known as interleukins) and prostaglandins. Such factors are known to produce inflammation and damage in tissues and cells.

Genetic Factors

A major study is underway to uncover the genetic factors that predispose certain women to endometriosis. The incidence of endometriosis in women who have a mother or sister with the disorder may be up to 10 times higher than average.

WHAT ARE THE SYMPTOMS OF ENDOMETRIOSIS?

Pelvic Pain (Dysmenorrhea)

Pain at the time of menstruation (*dysmenorrhea*) is the primary symptom and occurs in nearly all girls and women with endometriosis. Studies suggest that endometriosis is the cause of about 15% of cases of pain in the pelvic region in women. (This is the area in the lower trunk of the body.)

Timing of Pain . In addition to during menstruation, endometrial pain can occur at other times of the month. A survey published by the Endometriosis Association reported the following findings on the timing of endometrial pain:

- 71% of women reported pain within two days after their periods started.
- 47% reported pain in the middle of a cycle. (A sharp pain during ovulation may be due to an

endometrial cyst located in the fallopian tube that ruptures as the egg passes through.)

- 40% reported pain at other times of the month.
- 20% reported continual pain.
- 7% said there was no pattern.
- Many women experience pain during intercourse.
- Adolescents are more likely to experience pain that occurs both during their periods and at other times in the cycle, while in older women endometrial pain is more likely to occur during menstruation.

Location of Pain . Nearly all women with endometrial pain experience it in the pelvic area (the lower part of the trunk of the body). The pain is often a severe cramping that occurs on both sides of the pelvis, radiating to the lower back and rectal area and even down the legs.

Occasionally, however, pain may also occur in other regions. Implants can also occur in the bladder (although rare) and cause pain and even bleeding during urination. Also rarely, implants form in the intestine and cause painful bowel movements or diarrhea. Large cysts can rupture and cause very severe pain at any time in various locations.

Severity of Pain . The severity of the pain also varies widely and does not appear to be related to the extent of the endometriosis itself. In other words, a woman can have very small or few implants and have severe pain, while those with extensive endometriosis may have very few signs of the disorder except for infertility. [*See Also* How Serious Is Endometriosis?]

Infertility

Infertility is the other major indication of endometriosis, particularly when dysmenorrhea is also present. [For detailed description *see* How Serious Is Endometriosis?]

Other Symptoms

In addition to pain, patients may experience additional symptoms, which include the following:

- Fatigue
- Bloating
- Nausea
- Dizziness
- Heavy menstrual bleeding
- Headaches
- Depression and malaise (feeling generally low)
- Sleep problems

WHO GETS ENDOMETRIOSIS?

An estimated 2% to 4% of all premenopausal adult women have detectable endometriosis, and over a

third of these women experience noticeable pain. Because many women with endometriosis have no symptoms, the actual percentage of premenopausal women with the disorder may be as high as 15%. Endometriosis can occur in women of all ages and in any ethnic and social group. It has been reported in girls as young as 10 and in women over 75, with the average age being between 25 and 29. Approximately 40% to 60% of women with endometriosis report symptoms before age 25. Some experts believe endometriosis may be responsible for between 45% and 70% of chronic menstrual pain in adolescence.

Greater Exposure to Menstruation

Women at higher risk for endometriosis tend to have greater exposure to menstruation. Those at higher risk have a shorter than normal cycle, heavier periods, and longer periods. Heavier, more frequent periods, or longer exposure may simply make the risk for retrograde menstruation more likely. (This is the condition in which menstrual flows backward and is believed to be at least partially responsible for the initial development of endometriosis.) Menopause usually brings an end to mild to moderate endometriosis, although if women with a history of endometriosis take hormone replacement therapy (HRT), the condition may be reactivated.

Family History

Some experts report that almost 7% of first-degree female relatives of endometriosis patients also develop it. A family history of endometriosis not only puts women at high risk for the condition but possibly a more severe manifestation of it as well.

Endometriosis and Pregnancy

Studies are mixed on whether early pregnancy is protective against endometriosis. Some report that it is not, although women have relief from symptoms during pregnancy. Also, some women who become pregnant after surgery for endometriosis may be protected against relapse.

Other Risk Factors

Women may also be at higher risk for endometriosis if they were born with uterine abnormalities that obstruct the normal outflow of blood and cause retrograde menstruation. Oddly, women with red hair have an increased risk for endometriosis; experts guess that the gene determining red hair might be located near other genes that make such women susceptible to endometriosis.

Endometriosis is more prevalent in women with a family history of asthma and allergies, including food and skin allergies and hay fever. Women who drink large amounts of beverages with caffeine appear to have an increased risk for endometriosis, possibly because caffeine contributes to increased levels of the estrogen, estrone. Heavy alcohol use (which also increases estrogen levels) is also associated with endometriosis.

HOW SERIOUS IS ENDOMETRIOSIS?

Long-Term Outlook

Without treatment, endometriosis gets progressively worse in between 65% to 80% of women. Even with treatment, endometriosis continues to advance in 20% of patients. Cysts and implants may grow and spread to other parts of the pelvis, and in very severe cases, to the urinary or intestinal tracts. Eventually *adhesions* may form. These are dense, web-like structures of scar tissue that can attach to nearby organs and cause pain, infertility, and intestinal obstruction.

Pain

The most common problem for women with endometriosis is pain. The pain experienced around

menstruation can be so debilitating that up to 25% of women with the condition can be incapacitated for two to six days of each month. In severe cases, regular activities may be curtailed for up to two weeks per month. Sleeping problems have been reported in three quarters of patients, mostly due to pain.

Infertility

Medical literature indicates that endometriosis accounts for between 5% and 40% of infertility cases and that between 30% and 50% of women with endometriosis are infertile. Often it is difficult to determine if endometriosis is the primary cause of infertility in women have mild endometriosis. In an attempt at determining the chances for infertility, researchers have come up with a staging system based on findings during diagnostic surgery. [See Box [Staging Endometriosis.](#)] This is in How Is Endometriosis Diagnosed?

It should be noted that endometriosis rarely causes an absolute inability to conceive, but, nevertheless, it can contribute to it both directly and indirectly.

Direct Effect of Endometrial Cysts. Endometrial cysts may directly prevent infertility in a number of ways.

- If implants occur in the fallopian tubes, they may block the egg's passage.
- Implants that occur in the ovaries prevent the release of the egg.
- Severe endometriosis can eventually form rigid webs of scar tissue (adhesions) between the uterus, ovaries, and fallopian tubes, thereby preventing the transfer of the egg to the tube.

Immune Factors and the Inflammatory Response. Researchers are focusing on defects in the immune system that not only may be responsible for endometriosis in the first place but may also cause the infertility associated with endometriosis. Even in early stage endometriosis, investigators have observed increased immune system activity. It is possible that in such cases, the body perceived this foreign endometrial implants as hostile, and launches an attack.

In this process, the body over produces specific immune factors that contribute to infertility, such as the following:

- Cytokines. Cytokines are very potent immune factors that, when overproduced, cause damage and inflammation in the very regions that are directed to protect. Such damage could produce scarring and obstructions that interfere with implantation and development of a fertilized egg. In severe endometriosis, researchers have also observed inflammation in the fluid surrounding the uterus, which could create a hostile environment for the sperm. In one laboratory test, slower sperm were noted in fluid taken from women with moderate or severe endometriosis, although not in mild endometriosis.
- Prostaglandins. Elevated levels of these factors not only produce inflammation but increase uterine contractions. (Women with endometriosis have a higher than average risk for miscarriage.)
- Other Immune Factors. Growth factors (which stimulate growth of new blood vessels) and toxins produce by the implants could impair fertility.

Other Conditions Linking Endometriosis and Infertility. Researchers have sometimes noted unusually low levels of specific substances that enable a fertilized egg to adhere to the uterine lining. (Such abnormalities are more often a factor in infertility in women with mild to moderate endometriosis than in those with severe cases.)

One study found that the eggs in women with endometriosis appeared to have more genetic abnormalities than those in women without the disorder.

Associated Conditions

Of great concern are studies suggesting that women with endometriosis have a higher risk for certain conditions, including the following:

- Certain cancers, particularly for early-onset breast and ovarian cancers, non-Hodgkin's lymphomas, and melanoma.
- Autoimmune diseases (in which the body attacks its own cells), such as systemic lupus erythematosus, hypothyroidism, rheumatoid arthritis, and multiple sclerosis.
- Diabetes
- Allergies

Emotional Effects

The emotional effect of severe endometriosis can be almost as devastating as the pain. It can effect marriages and work. In one survey conducted by the Endometriosis Association, patients reported the following emotional effects from this disease:

- 84% of patients reported feeling depressed during periods of pain.
- 75% felt irritable.
- Over half reported feelings of anxiety and anger.
- About 20% said they felt hopeless.

In one study, during the days around menstruation 30% of women with endometriosis increased their alcohol intake compared to 14% of women with other gynecological problems and only 9.5% of women with no gynecological disorders.

HOW IS ENDOMETRIOSIS DIAGNOSED?

Although endometriosis is the most commonly diagnosed uterine disorder, it is often misdiagnosed or missed altogether. In a British study of women with proven endometriosis, over half of them had been told by a physician that nothing was wrong. Endometriosis frequently begins to develop in adolescence, but is often not diagnosed for over a decade. There are a number of reasons for this. First, the symptoms vary so widely, and sometimes do not occur at all. Some women, then, do not know they have endometriosis until they fail to become pregnant and seek help for infertility. Also, pain in the pelvic or abdominal area can be caused by so many conditions that it is often difficult to pin down the precise cause [*see Ruling out Conditions with Similar Symptoms below*]. In one survey, half of women with endometriosis reported that they had to visit a physician five or more times before they were diagnosed.

Ruling out Conditions with Similar Symptoms

Many conditions cause pelvic pain. In many cases, the cause is unknown and it often resolves on its own. In one study, pelvic pain improved or resolved without treatment in 77% of women over a 15-month period. On the other hand, some causes of pelvic pain can be serious and should be ruled out during a work-up for endometriosis.

Primary Dysmenorrhea. Primary dysmenorrhea is recurrent pelvic pain associated with menstruation whose cause is unknown. Dysmenorrhea is common in many women. [*See Well-Connected Report #100, Menstrual Disorders: Dysmenorrhea.*]

Adenomyosis. A condition called adenomyosis occurs when *nodules* (knots) of endometrial tissue develop within the deep muscle layers of the uterus. This disorder is often classified with endometriosis, but it actually is a different disease. (Endometriosis occurs when endometrial tissue grows and functions *outside* the uterus.) Adenomyosis is a significant cause of pelvic pain and menstrual irregularities. Until recently this was only diagnosed after a hysterectomy, but advanced imaging techniques using ultrasound and magnetic resonance imaging scans may be able to detect it.

It typically occurs women who have uterine fibroids [*see* Well-Connected Report #73, Uterine Fibroids] and in women between the ages of 40 and 50, and who have had children. There is some evidence that newer IUDs called levonorgestrel-releasing intrauterine systems (LNG-IUS) may be useful in treating them.

Other Causes of Pelvic Pain. Pelvic pain can be caused by a number of other conditions, including the following:

- Pelvic inflammatory disease (PID), which are infections in the pelvic area.
- Uterine fibroids
- Miscarriage
- Ectopic pregnancy
- Pelvic cancer (rare)
- Severe kidney or urinary tract infections

Other Causes of Severe or Chronic Gastrointestinal Pain. Severe pain in the gastrointestinal (GI) tract from endometriosis may also be confused with appendicitis, inflammatory bowel disease, diverticulitis, and irritable bowel syndrome (IBS).

Physical Examination

The physician may be able to feel tender masses or nodules during a pelvic examination, but these signs can indicate many conditions and do not necessarily mean endometriosis is present.

Diagnostic Procedures

Laparoscopy. Diagnostic laparoscopy, an invasive surgical procedure, is currently the *only* definitive method for diagnosing endometriosis. Laparoscopy normally requires a general anesthetic, although the patient can go home the same day. The procedure is as follows:

- The surgeon makes tiny abdominal incisions through which a fiber optic tube, equipped with small camera lenses, is inserted.
- The physician uses these devices to view the uterus, ovaries, tubes, and peritoneum (lining of the pelvis) on a video monitor.
- If the surgeon needs to remove cysts or lesions during the procedure (operative laparoscopy), tiny instruments are passed through a tube. Smaller endometrial implants can often be removed at that time, either by excision (surgical removal) using a laser or scissors or by destroying the area with lasers or with electricity (or electrocautery).
- A blue dye may be flushed through the fallopian tubes to determine blockage; if there is an obstruction, the dye will not flow through the tube.

The procedure is used not only for detecting but also for staging endometriosis to determine its severity. [See Box [Staging Endometriosis](#).] In some cases, the procedure itself will restore fertility in women with endometriosis. Endometrial implants that are very deep or hidden by other structures, however, may be missed and need more extensive surgery. [See [What Are the Surgical Treatments for Endometriosis?](#) *below*.]

Hysteroscopy. Hysteroscopy is a procedure that may be used to detect the presence of fibroids, polyps, or other causes of bleeding. (It may miss cases of uterine cancer, however, and is not a substitute for more invasive procedures, such as D&C or endometrial biopsy, if cancer is suspected.)

It is done in the office setting and requires no incisions. The procedure uses a long flexible or rigid tube called a *hysteroscope*, which is inserted into the vagina and through the cervix to reach the uterus. A fiber optic light source and a tiny camera in the tube allow the physician to view the cavity. The uterus is filled with saline or carbon dioxide to inflate the cavity and provide better viewing. This can cause cramping.

Hysteroscopy is non-invasive, but 30% of women report severe pain with the procedure. The use of an anesthetic spray such as lidocaine may be highly effective in preventing pain from this procedure. Other complications include excessive fluid absorption, infection, and uterine perforation. Hysteroscopy is also employed as part of surgical procedures. [See [Operative Hysteroscopy](#) *below*].

Imaging Techniques

An ultrasound is performed in cases where other conditions are suspected, such as uterine fibroids, ovarian cysts, or ectopic pregnancy. This non-invasive imaging technique can detect endometriomas, or cysts that are usually located on the ovaries and filled with thick dark blood. Ultrasound can also pick up cysts larger than 1 cm (about 1/3 in.), but will miss smaller cysts, or small and shallow endometrial implants on the surface of ovaries, or on the peritoneum (lining of the pelvis).

Once a diagnosis is made, more sophisticated imaging techniques, such as computed tomography (CT) scanning or magnetic resonance imaging (MRI), may be used to obtain a more accurate image of severe endometriosis, but these techniques are expensive and are not useful in reaching a diagnosis of endometriosis.

Blood Tests for CA-125

Experts hope that in the near future, blood tests can be developed that will identify endometriosis by measuring high levels of specific chemical substances released by the implants. Some researchers believe that deep invasive endometriosis may be detected by using a combination of a vaginal examination during menstruation and a blood test for CA-125. This substance is elevated in women with ovarian endometriomas (cysts) and deep endometriosis. Higher levels of CA-125 occur in many other diseases, including ovarian cancer, so results using this test alone do not provide enough information for a definitive diagnosis of endometriosis. On the other hand, the test could be used to indicate whether there is need for more invasive tests in women who are infertile, and also for monitoring the effectiveness of treatments in women with severe endometriosis.

Staging Endometriosis

During laparoscopy, the surgeon determines the number, size, and location of endometrial implants and adhesions and uses this information to rank endometriosis by the extent of the disease and so the likelihood of infertility:

- Minimal (Stage I)
- Mild (Stage II)
- Moderate (Stage III)
- Severe (Stage IV)

A number of experts do not believe these categories are useful, because they often do not relate to the intensity of the pain nor even to treatment success rates.

Some experts believe it would be more accurate to further categorize endometriosis by the depth of penetration:

- Superficial Endometriosis. Endometriosis that lies more on the surface is more highly associated with infertility than deep implants.
- Infiltrative Endometriosis. Implants deeper than 5 to 6 mm; deep implants are believed to be the best indicator of progression and severe symptoms.

WHAT ARE THE GENERAL GUIDELINES FOR TREATING ENDOMETRIOSIS?

To date, there is no perfect way of managing endometriosis. There are basically three approaches to the treatment of endometriosis:

- Watchful Waiting. (Treatments involve relieving symptoms.)
- Hormonal Therapy. (Aimed at reducing endometrial implants.)
- Surgery. (Aimed at reducing endometrial implants, restoring fertility, or possible a cure.)

The choice depends on a number of factors including the woman's symptoms, her age, whether fertility is a factor, and the severity of the disease.

Watchful Waiting

In general, watchful waiting is a good initial choice for the following:

- Women with mild pain and, if infertile, they do not wish to become pregnant. If women with mild endometriosis wish to become pregnant, the doctor may recommend unprotected sex for six months to year. If pregnancy does not occur, then treatment may be started.
- Women approaching menopause.

Some experts believe that early diagnosis and treatment in young women without symptoms might prevent some cases of infertility later on. Unfortunately, however, some treatments for endometriosis may actually trigger symptoms in those who do not yet experience them.

Hormonal Therapy

Hormone therapies are used to mimic states in which ovulation does not occur (such as pregnancy or menopause) or to directly block ovulation. Such agents include oral contraceptives, progestins, GnRH agonists, and danazol). They can be very effective in relieving endometriosis symptoms. Some of these drugs may also be used after surgery to help prevent recurrence of endometriosis. There is also some evidence that GnRH agonists and danazol may improve immune factors associated with endometriosis. But there are downsides:

- None of these agents can cure the problem. Symptoms recur in about half of patients within five years of treatment.
- They do not improve fertility rates and may even delay conception in women who use them.
- Side effects of these drugs can be distressing. There is a high dropout rate with the use of nearly all these hormonal treatments.
- Women who are taking GnRH agonists, danazol, or similar agents should use non-hormonal birth control methods (such as the diaphragm, cervical cap, or condoms) because these drugs can increase the risk for birth defects. [For specific descriptions of these drugs, *see* What Are the Hormonal Agents Used for Endometriosis? *below* .]

Surgery

Surgery is an option for the following women

- Women with severe pain that does not respond to watchful waiting and medical treatment.
- Women who want to become pregnant and endometriosis is most likely the major contributor to infertility.

There are two basic surgical approaches for endometriosis:

- *Conservative Surgery* . This approach removes the endometriosis implants without removing any other reproductive organs and is a good option for women who wish to become pregnant or who cannot tolerate hormone therapy. Endometriosis often recurs after conservative surgery, however. Recurrence rates at two years range from 2% to 47%. The risk for recurrence or residual pain after any procedure increases with the severity of the condition, particularly if endometriosis has affected areas outside the uterus.
- *Definitive Surgical Therapy* . This is the only cure for endometriosis and involves hysterectomy with removal of ovaries (oophorectomy) along with all endometrial implants. (Removing only the uterus with hysterectomy is not curative and recurrence is a risk as it is with conservative surgery.)

In choosing between hysterectomy (with or without oophorectomy) and conservative surgeries, age and the desire for children are important factors. One study reported a greater sense of loss, more residual symptoms, and more pain in younger women (under 30) who have undergone hysterectomy than in older women. In one study, 37% of such younger women regretted their decision to have a hysterectomy.

Once careful instruction is given for all the risks and benefits of the different surgical options, the physician must then respect any decision a patient makes to retain as much of her reproductive system as she wants, even if she is past menopause. Both the patient and the physician should also be clear about the possibility of changing procedures once the operation has begun, depending on what the surgeon may observe. For example, the surgeon may find abnormalities that require more extensive

surgery.

Much of the success of any procedure relies on the experience of the surgeon. A woman should always ask for a doctor's track record, or the number of times he or she has performed the procedure in question. The more, the better. Asking for complication rates may be helpful, but a patient should realize that an experienced surgeon may have a higher number of high-risk patients, and therefore, a higher complication rate than a less experienced surgeon with fewer serious cases.

Options for Treating Infertility

Hormonal agents have no effect on infertility, while in many cases, conservative surgery may restore fertility. Fertility treatments using assisted reproductive techniques may be helpful for women with late-stage endometriosis. It is not clear in such women whether surgery for removing endometrial implants or fertility has different or better advantages. It is also not clear if women with early-stage endometriosis do any better with fertility treatment than simply trying to become pregnant through non-aggressive means. [For more information, see the *Well-Connected* Report #22 *Infertility in Women*.]

WHAT ARE THE LIFESTYLE MANAGEMENT OPTIONS FOR ENDOMETRIOSIS?

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) and Pain Relief

Over-the-counter nonsteroidal anti-inflammatory drugs (NSAIDs) may be sufficient for about 75% of women with endometrial pain. Aspirin is the most common NSAID, but there are dozens of others, including ibuprofen (Advil, Motrin, Rufen) and naproxen (Aleve, Anaprox, Naprosyn), both of which are often recommended for menstrual pain. Such drugs block prostaglandins, inflammatory factors strongly associated with endometriosis and which increase uterine contractions and cause cramping and pain.

Note: Drugs containing codeine should not generally be used for endometriosis pain management. They can cause pelvic congestion and constipation, which could exacerbate symptoms in patients with gastrointestinal distress.

Dietary Factors

Some women report relief by avoiding dairy products and having a diet rich in fiber and low in saturated (animal) fats. Fiber-rich foods (such as fruits and vegetables) along with plenty of fluids (water or juice, not caffeine) are not only healthy but help prevent constipation, which can intensify symptoms. If women choose a diet that limits dairy products, they should be sure to have sufficient calcium from other sources.

Certain fat compounds called omega-3 fatty acids, which are in fish oils, may have specific anti-inflammatory effects. They are found in certain oily fish (sardines, mackerel) and can be obtained in supplements. Supplements may be labeled either omega-3 fatty acids or EPA-DHA (which are the important compounds).

People with endometriosis should avoid alcohol, caffeine, and chocolate.

Contrast Sitz Baths

A sitz bath is simply sitting in a basin of water. Some people report relief by alternating between sitting three minutes in a hot water basin and then one minute in a cold water basin. This is repeated three times. The procedure is performed twice a day three to four days a week, except during menstruation.

Kegel Exercise

Kegel exercises are designed to strengthen the muscles of the pelvic floor that both support the bladder and close the sphincters, and some people find they help endometriosis. The exercises consist of tightening and releasing the pelvic muscle. Since the muscle is internal and is sometimes difficult to isolate, doctors often recommend practicing while urinating on the toilet. The patient tries to contract the muscle until the flow of urine is slowed or stopped and then releases it. (It is important to note, however, that, once learned, Kegel exercises should not be regularly performed while urinating; such a practice may eventually weaken the muscles.)

Exercise

Exercise may be very helpful for women with endometriosis. It relieves stress and tension and may reduce estrogen levels.

Alternative Treatments

Certain integrative methods may be helpful and safe: Some women have reported relief from pelvic pain after acupuncture. Yoga and other practices that involve breathing, meditative techniques may reduce stress and depression related to endometriosis. Ginger tea may help relieve nausea.

An analysis of the few studies done on evening primrose oil found that it contains a polyunsaturated fatty acid known as gamma linolenic acid, which seems to block the release of cytokines and prostaglandins, substances that are manufactured by the endometrium and are involved in uterine muscle contraction and cramping. Foods that contain gamma linolenic acid are black currant oil and cold-water fish.

Patients should always approach alternative treatments that involve untested herbal or so-called natural remedies with caution, however. It is certainly possible that some may be helpful, but patients should always be wary of unproven claims for quick cures. [See warning box.]

Warnings on Alternative and So-Called Natural Remedies

It should be strongly noted that alternative or natural remedies are not regulated and their quality is not publicly controlled. In addition, any substance that can affect the body's chemistry can, like any drug, produce side effects that may be harmful. There have been a number of reported cases of serious and even lethal side effects from herbal products. In addition, some so-called natural remedies were found to contain standard prescription medication. Most problems reported occur in herbal remedies imported from Asia. Even if studies report positive benefits, most, to date, are very small. In addition, the substances used in such studies are, in most cases, not what are being marketed to the public.

The following website is building a database of natural remedy brands that it tests and rates. Not all are available yet. <http://www.ConsumerLab.com/>

The Food and Drug Administration has a program called MEDWATCH for people to report adverse reactions to untested substances, such as herbal remedies and vitamins (call 800-332-1088).

WHAT ARE THE SPECIFIC HORMONAL AGENTS USED FOR ENDOMETRIOSIS?

The basic approach in hormonal treatments for endometriosis is to block production of female

hormones (estrogen and progesterone) or to prevent ovulation with other hormonal effects.

- **Inducing Pseudopregnancy:** Agents that mimic a pregnant state block ovulation. The standard agents are oral contraceptives that contain estrogen and progestins. (Progestins are natural or synthetic forms of progesterone). Progestins may also be used alone, since they have specific effects that can cause the endometrial tissue itself to atrophy.
- **Inducing Pseudomenopause:** Drugs that mimic menopause are those that reduce estrogen and progesterone to their lowest level. They include gonadotropin-releasing hormone (GnRH) agonists or gestrinone, an anti-progesterone.
- **Inducing On-going Blockage of Ovulation.** Danazol, a derivative of male hormones, is a powerful ovulation blocker.
- At this time, studies report that between 80% and 85% of women achieve pain relief after taking these agent. None of these agents appear to be any better than another in its ability to reduce pain. Women should discuss the side effects of particular medications with their physicians to determine the best choice.
- It should be noted that these hormonal agents are used for pain relief only. None improve fertility rates and in some cases may delay conception.

Oral Contraceptives

Oral contraceptives combining estrogen and a progestin are most often used for treating endometriosis. When used throughout a menstrual cycle, they suppress the actions of other reproductive hormones (luteinizing hormone, or LH, and follicle stimulating hormone, or FSH) and prevents ovulation. There are many brands available. The estrogen compound used in most oral contraceptives is *estradiol*. Many different progestins are used, and there are many brands. None to date have proven to be superior over others. Women should discuss the best options for their individual situations with their physician. [*Also See Well-Connected Report #91 Contraceptives: Female.*]

Progestins

Progestins alone may be helpful and are the oldest drugs used for endometriosis. Progestins can prevent ovulation and reduce the risk for endometriosis in the following ways:

- They luteinizing hormone (LH), one of the reproductive hormones important in ovulation.
- They change the lining of the uterus and eventually cause it to atrophy.
- One study reported that progestins provide temporary pain relief equivalent to the more powerful hormone drugs, such as danazol or a GnRH agonist. Some experts recommend them as the first choice for women with endometriosis who do not want to become pregnant. Progestins should not be given during the luteal phase (the premenstrual phase, which is 14 days before a period.)

Specific Progestins. Medroxyprogesterone (Depo-Provera), which is administered by injection typically every three months, are the standard progestins used. Others sometimes tried include norethisterone, dienogest, and lynestrenol. Some of these progestins may have fewer side effects than Depo-Provera. For example, in one study 94% of patients achieved some pain relief from norethindrone (Aygestin, Norlutate); only 7% dropped out because of side effects. A recent version of the intrauterine device (IUD) called the LNG-releasing intrauterine system (LNG IUS) releases progesterone and may have specific benefits against endometriosis. [*Also See Well-Connected Report #91 Contraceptives: Female.*]

Side Effects of Progestins. Side effects of progestin occur in both the combination oral contraceptives and any contraceptive that only uses progestin, although they may be less or more severe depending on the

form and dosage of the contraceptive. Side effects may include the following:

- Changes in uterine bleeding. Such as higher amounts during periods, spotting and bleeding between periods (called break-through bleeding), or absence of periods. Be sure to check with the physician if any of these occur.
- Unexpected flow of breast milk. (Check with the physician if this occurs to be sure other abnormalities are not causing it.)
- Abdominal pain or cramps.
- Diarrhea.
- Fatigue, unusual tiredness, weakness.
- Hot flashes.
- Decreased sex drive.
- Nausea.
- Trouble sleeping.
- Acne or skin rash. (Low-dose OCs actually improve acne. Only Ortho Tri-Cyclen is approved for this.)
- Depression, irritability, or other mood changes.
- Swelling in the face, ankles, or feet.
- Weight gain.
- Progestins used in contraceptives that work only in the uterus, such as the LNG-IUS IUD, may not pose as high a risk for these side effects.

GnRH Agonists

At this time, gonadotropin releasing hormone (GnRH) agonists are the most effective hormone treatments for endometriosis. They are able to block the release of the reproductive hormones LH (luteinizing hormone) and FSH (follicular-stimulating hormone). As a result, the ovaries stop ovulating and no longer produce estrogen. They relieve pain in most patients by the second or third month.

Specific GnRH Agonists. GnRH agonists include goserelin (Zoladex), buserelin, a monthly injection of leuprolide (depot Lupron), and a nasal spray, Nafarelin (Synarel). Studies have reported that nafarelin shrank all implants and significantly relieved symptoms in 85% of patients, delayed recurrence of endometriosis after surgery, and in comparison with leuprolide, was less expensive, had fewer side effects, and a provided better quality of life.

Common Side Effects. Commonly reported side effects (which can be severe in some women) include:

- Hot flashes and night sweats.
- Reduced sexual drive.
- Insomnia.
- Headache.

- Muscle aches.
- Nausea and vomiting.
- Memory loss.
- Changes in the skin and hair.
- Rapid heartbeat.
- Vaginitis.
- Dryness and/or burning sensations in the vaginal area.
- Weight changes.
- Depression. One study using the antidepressant sertraline (Zoloft) suggested that this agent and possibly other, similar agents known as serotonin reuptake inhibitors (SSRIs) may have specific actions that successfully treat depression from ovulation suppression.

Side effects vary in intensity depending on the GnRH agonist. They may be more intense with leuprolide and persist after the drug has been stopped.

Risk for Osteoporosis. Estrogen loss from GnRH agonists increases the risk for bone loss and osteoporosis. Women ordinarily should not take them for more than six months. Certain other factors intensify the risk:

- Smoking.
- A history of polycystic ovarian syndrome (with infrequent periods).
- Alcohol abuse.
- Long-term use of corticosteroids, which also reduce bone density.
- A family history of osteoporosis.

Certain approaches may preserve enough estrogen to protect bones and still effectively relieve endometriosis symptoms.

- Add-back therapy provides doses of estrogen and progestin that are high enough to maintain bone density but are still sufficiently low so that pain-reducing effects of the GnRH agonist are preserved.
- Taking GnRH agonists in very low doses is an alternate approach, but is still largely untested.
- Adding a bone-protective agent called a bisphosphonate (alendronate or etidronate) may also be helpful.

Other agents are being tested in combination with a GnRH agonist to preserve bone. They include parathyroid hormone or tibolone (available in Europe). Tibolone is known as a selective estrogen-receptor modulator (SERM), which means it has some, but not all, of the effects of estrogen.

Effects on Pregnancy. GnRH treatments used alone do not prevent pregnancy. Furthermore, if a woman becomes pregnant during their use, there is some risk for birth defects. Women who are taking GnRH agonists should use non-hormonal birth control methods, such as the diaphragm, cervical cap, or

condoms while on the treatments.

Danazol

Danazol (Danocrine) is a synthetic substance that resembles a male hormone. It suppresses the pathway leading to ovulation. Studies have shown symptomatic improvement in 90% of women, although in one study, only about 58% of women expressed satisfaction with this therapy. A high drop-out rate occurs, most likely because of adverse side effects, particularly male characteristics, such as growth of facial hair, acne, weight gain, dandruff and deepening of the voice. Danazol may increase the risk for unhealthy cholesterol levels. A few cases of blood clots and strokes have also been reported, as well as rare cases of liver damage. One study reported that taking a low dose may relieve endometrial symptoms and reduce the risk for these side effects. Exercise may help reduce side effects. As with GnRH agents, pregnant women or those trying to become pregnant should not take this drug because it may cause birth defects.

Antiprogestins

Antiprogestins are promising agents for endometriosis because they reduce both estrogen and progesterone receptors. Gestrinone is the standard agent, which may be comparable to GnRH agonists in reducing pain and have fewer menopausal symptoms. In one study bone density even increased slightly. Adverse effects of gestrinone include male hormone symptoms, such as acne, and possibly the development of unhealthy cholesterol levels.

RU486, or mifepristone, is another antiprogestin. In one six-month study, mifepristone improved symptoms and reduced endometrial implants without causing menopausal side effects. Unfortunately, it is commonly known as the "abortion pill" because its antiprogestin effects can induce miscarriage, and so its use is limited.

Investigative Hormones

Aromatase Inhibitors. Drugs that inhibit aromatase, an enzyme that is a major source of estrogen in postmenopausal women are being studied for effects against endometriosis. Such drugs include anastrozole, letrozole, exemestane, and vorozole. Aromatase levels may be abnormal in women with endometriosis. This fact plus one case in which an aromatase inhibitor successfully treated severe postmenopausal endometriosis have encouraged some experts to seek further research.

Leukotriene-Antagonists. Leukotriene-antagonists are drugs that block leukotrienes, powerful immune system factors that, in excess, produce a battery of damaging chemicals that can cause inflammation and spasms in the smooth muscles. Such immune factors are common in asthma and have also been found in high levels in some women with dysmenorrhea. Leukotriene-antagonist drugs such as zafirlukast (Accolate), montelukast (Singulaire), and zileuton (Ziflo), are being used to treat asthma, and some research is underway to determine if they are able to relieve menstrual pain.

Selective Estrogen-Receptor Modulators (SERMs). Drugs known as selective estrogen-receptor modulators (SERMs) are thought to act like estrogen in some tissues but behave like estrogen blockers (antiestrogens) in others. They have not been widely studied for endometriosis since tamoxifen (Nolvadex), the most commonly used SERM, may worsen endometriosis. The actions of some other SERMs, however, such as raloxifene (Evista) or tibolone (only available in Europe at present), may be beneficial and warrant more research.

WHAT IS CONSERVATIVE SURGERY FOR ENDOMETRIOSIS?

Goals of Surgery

The goal of conservative surgery is to aggressively remove as many endometrial implants and cysts as possible without causing surgical scarring and subsequent adhesions that could cause fertility problems.

Improving Fertility. Surgery has been shown to help improve infertility rates in women with severe endometriosis (Stages III and IV). Whether it improves pregnancy rates over doing nothing in women with mild to moderate endometriosis (stage I or II) is unclear. An analysis of studies published between 1977 and 1996 reported that surgery improved fertility for all stages of endometriosis, but the additional advantages for women in early-stage endometriosis seem slight. Some physicians recommend conservative surgery in some women as soon as endometriosis is diagnosed, even if it is mild, because of the progressive nature of the disorder. In any case, if endometriosis is found on the ovaries and fallopian tubes, it is particularly important that the first surgical attempt remove all the implants because subsequent surgeries become less effective in restoring fertility.

Reducing Pain and its Recurrence. Studies report pain reduction after surgery in over 60% of women. Conservative surgery, however, can miss microscopic implants that may continue to cause pain and other symptoms after the procedure.

Even with very successful surgery, endometriosis usually recurs within a period of between two months and several years. In one study, the risk for recurrence after conservative surgery was highest in women who have had previous surgery or who have Stage IV disease (large endometriotic cysts). Other factors including age, pregnancy, or the number of cysts, did not seem to influence the degree of risk. An earlier study indicated that women who became pregnant after surgery for endometriosis had a lower risk for recurrence, but pregnancy itself does not cure endometriosis. The use of GnRH agonists after surgery may delay recurrence without affecting fertility.

Choosing the Surgical Approach (Laparoscopy vs. Laparotomy)

The two conservative procedures used are either laparoscopy or laparotomy. Both are effective, although the cost is lower with laparoscopy and recovery is faster.

Laparotomy uses a wide abdominal incision and conventional surgical instruments. It is more invasive and requires a longer recovery time. In some severe cases, the physician may need a wider view of the pelvic area and will perform this procedure. Laparotomy is typically used for infiltrating endometriosis, although the less invasive laparoscopy is showing increasing effectiveness, even for deep implants.

Laparoscopy is now the standard conservative surgical treatment for endometriosis. In one study, laparoscopy achieved pain relief in over 62% of women. In addition, pregnancy rates can range from 20% to over 50% after laparoscopy. Still, recurrence rates for laparoscopy are no better than those with laparotomy. The procedure is as follows:

Laparoscopy is usually done under general anesthetic and involves the following:

- Carbon dioxide gas is injected into the abdomen, distending it and pushing the bowel away so that the physician has a wider view.
- The procedure requires making small incisions at the navel and above the pubic bone.
- The laparoscope (a hollow tube equipped with camera lenses and a fiber optic light source) is inserted through the incision at the navel (the umbilical incision).
- A probe is then inserted through the second incision allowing the physician to directly view the outside surface of the uterus, fallopian tubes, and ovaries.
- One or two additional small incisions can be made on either side of the lower abdomen through these incisions. Surgical instruments or other devices are passed through these accessory incisions to destroy or remove abnormal tissue.

- *Methods for Destroying the Endometrial Implants.* There a number of methods used to actually destroy or eliminate endometrial implants or adhesions. Superficial implants or adhesions are often vaporized, cauterized, or coagulated using electrical or laser devises. Excision (removal of implants by cutting) is used for deep, inaccessible implants. An ovary affected by endometriosis can be treated with electro- or laser surgery, which removes the implant, drains the cyst cavity, and destroys the cyst lining.

Complications after Surgery

Many patients experience temporary but severe discomfort in the shoulders after laparoscopy due to residual carbon dioxide gas that puts pressure on the diaphragm. The incisions, even with laparoscopy, may cause pain afterward, which can usually be treated effectively with mild pain relievers. There are small risks for bleeding, infection, and reaction to anesthesia. Surgery in the pelvic area may also cause scarring, which may interfere with fertility. Lubricating gels (Intergel) used during such pelvic operations may help reduce this risk. More studies are needed.

Pre- and Postoperative Drug Treatment

Preoperative Drug Treatment. Hormonal agents administered before surgery are being investigated to reduce the size of endometrial cysts and so perhaps to improve outlook. A 2000 study, for example, reported that the GnRH agonist goserelin injected monthly twelve weeks before laparoscopy resulted in much smaller implants and better treatment of the disease than treatment with surgery alone.

Postoperative Drug Treatment. A number of studies have also been conducted to determine if taking hormonal agents *after* surgery can provide further pain relief. Results have been mixed, and the benefits, if any, are probably slight.

Procedures that Sever Pain-Causing Nerves

Neurectomy, also called nerve resection or ablation, involves cutting the nerves that cause pain.

Laparoscopic Uterosacral Nerve Ablation. Laparoscopic uterosacral nerve ablation (LUNA) may be used to sever nerves and relax the ligaments that attach to the bottom of the uterus. In one systematic review, there were no differences in pain relief between women who had the procedure and those who didn't. Some small studies have reported benefits. In all, evidence is lacking on the value of this procedure and there are some risks to it.

Presacral Neurectomy. If pain in the middle pelvic area persists, a procedure called presacral neurectomy may be beneficial. With this procedure the surgeon uses either electricity (electrocautery) or lasers to destroy tissue containing pain-causing nerves, deep in the pelvic region. Studies indicate that regardless of the severity of the case, pain is reduced in 50% to 90% of patients and the benefit can last for more than a year. In one study, major complications occurred in 0.6% of cases. Constipation is a very common side effect and is easily relieved with medication.

WHAT IS RADICAL SURGERY (HYSTERECTOMY) FOR ENDOMETRIOSIS?

Indications for Hysterectomy

Hysterectomy is the surgical removal of the uterus. By age 60, 25% of American women have had this procedure. More than 500,000 hysterectomies are performed each year in the US, which is the highest rate among any nations with published data on this procedure. It is twice the rate of hysterectomies in English women and four times the rate in French women.

Studies report that between 11% and 19% of all hysterectomies are performed to treat extensive

endometriosis. Having endometriosis plus severe symptoms is, in fact, a major risk factor for eventually requiring a hysterectomy. It should be noted that hysterectomy does not necessarily cure endometriosis. One study reported that endometriosis reappeared in 13% of women within three years of a hysterectomy and in 40% after five years.

Most women are satisfied with the procedure. A major analysis of evidence on hysterectomies reported that symptoms related to menstrual problems decline significantly in most women, although none completely disappear for all women. The majority of women also experience improved quality of life and emotional functioning, although 8% of women who were not depressed and 12% of women who were not anxious before the procedure developed these emotional states afterward.

Still, one study suggested that 70% of recommendations for hysterectomies did not meet the standard of care as determined by expert groups. In such cases, patients were not given alternative choices or adequate diagnostic evaluations. Any woman, even one who has reached menopause, who is uncertain about a recommendation for a hysterectomy for fibroids should certainly seek a second opinion.

Determining the Extent of the Hysterectomy

Once a decision for a hysterectomy has been made, the patient should discuss with her physician what will be removed. The common choices are:

- Total Hysterectomy (Removal of uterus and cervix).
- Supracervical Hysterectomy (Removal of uterus and preservation of the cervix). Procedure is performed in about 20% to 25% of cases.
- Bilateral Salpingo-Oophorectomy (Removal of the ovaries). It can be used with either total or supracervical hysterectomy.

Total Hysterectomy . In a total hysterectomy the uterus and cervix are removed; this eliminates the risk of uterine and cervical cancer. (Given technical advances and growing surgical experience, a total hysterectomy may eventually be unnecessary except in special circumstances, such as when cancer is present.)

Supracervical Hysterectomy . In a supracervical hysterectomy the uterine body is removed and the cervix is retained. Retaining the cervix helps support the pelvic floor and may help maintain full sexual sensation, but the risk for cervical cancer remains.

Bilateral Salpingo-Oophorectomy . Bilateral salpingo-oophorectomy is the removal of the fallopian tubes plus ovaries. It may be performed with either total or supracervical hysterectomy. In deciding to remove the ovaries, a woman must be aware of various consequences, both positive and negative.

Oophorectomy significantly reduces that rates of re-operation and endometrial pain recurrence compared to hysterectomy alone. Oophorectomy also helps to reduce the risk for ovarian cancer by elimination of ovaries and for breast cancer by causing estrogen loss. Premenopausal women should realize, however, that it promotes menopause immediately, which poses a risk for a number of health problems. These include osteoporosis, heart disease, skin wrinkling, and reduction in muscle tone. Estrogen replacement can help offset them.

Abdominal vs. Vaginal Hysterectomy

There is still a further choice, which is whether the hysterectomy should be performed through an incision in the abdomen or performed through the vagina. A variant of vaginal hysterectomy, called laparoscopic-assisted vaginal hysterectomy (LAVH), is yet another option.

Abdominal Hysterectomy . Abdominal hysterectomy is the most common procedure. A wide incision is required to open the abdominal area, from which the surgeon removes the uterus. If possible, the

incision should cut horizontally across the top of the pubic hairline (the bikini incision). This incision heals faster and is less noticeable than a vertical incision, which is used in more complicated cases. The patient may need to remain in the hospital for three to four days, and recuperation at home takes about four to six weeks.

Vaginal Hysterectomy. Vaginal hysterectomy is used in about a quarter of the cases, although this procedure is being increasingly performed. It requires only a vaginal incision through which the uterus is removed.

Laparoscopic-Assisted Vaginal Hysterectomy. Laparoscopic-assisted vaginal hysterectomy (LAVH) is employed in only less than 4% of procedures. It uses several small abdominal incisions through which the surgeon severs the attachments to the uterus and ovaries. They can then be removed through the vaginal incision, as in the standard approach. Hospitalization stays may be longer and costs are greater than with standard vaginal hysterectomy. At this time LAVH may be an alternative to abdominal hysterectomy in certain cases when a standard vaginal hysterectomy is not appropriate.

Postoperative Care

If possible, a patient should ask a family member or friend to help out for the first few days at home. The following are some of the precautions and tips for postoperative care:

- For a day or two after surgery, the patient is given medications to prevent nausea and pain killers to relieve pain at the incision site.
- As soon as the physician recommends it, usually within a day of the operation, the patient should get up and walk in order to help prevent pneumonia, reduce the risk of blood-clot formation, and to hasten recovery.
- Walking and slow, deep breathing exercises may help to relieve gas pains, which can cause major distress for the first few days.
- Coughing can cause pain, which may be reduced by holding a pillow over a surgical abdominal wound or by crossing the legs after vaginal surgery.
- Patients are advised not to lift heavy objects (including small children), not to douche or take baths, and not to climb stairs or drive for several weeks.
- For the first few days after surgery, many women weep frequently and unexpectedly. These mood swings may be due to depression from the loss of reproductive capabilities and from abrupt changes in hormones, particularly if the ovaries have been removed.

The patient should discuss with the physician when exercise programs more intense than walking can be initiated. The abdominal muscles are important for supporting the upper body, and recovering strength may take a long time. Even after the wound has healed, the patient may experience an on-going feeling of overall weakness, which can be demoralizing, particularly in women used to physical health. Some women do not feel completely well for as long as a year; others may recover in only a few weeks.

Complications Following the Procedure

Minor complications after hysterectomy are very common. About half of women develop minor and treatable urinary tract infections. There is usually mild pain and light vaginal bleeding post operation. The infrequent occurrence of severe bleeding or hemorrhaging after vaginal hysterectomy, or laparoscopic-assisted vaginal hysterectomy, may be promptly treated by laparoscopy.

More serious complications, such as those described below, are uncommon but patients should be aware of their symptoms and call the physician immediately if they occur.

Among the three procedures, a 2001 Australian study reported that complication rates were 44% for abdominal hysterectomy, 24% for vaginal hysterectomy, and only 2% for LAVH. (LAVH is used in less than 4% of hysterectomies, however.)

Infection. Infection occurs in 10% to 15% of patients, the risk being higher with abdominal than with vaginal surgery. Risk factors for infection appear to be obesity, a longer than normal operative time, and low socioeconomic status. Patients should be aware of any symptoms and call the physician immediately if they occur: Symptoms of infection might include:

- Continuing or increasingly severe pain.
- Fever.
- Heavy discharge.
- Bleeding (antibiotics given at the time of surgery help to reduce this risk).

Blood Clots. There is a slight risk for small blood clots, usually in veins of the legs (thrombophlebitis). A sudden swelling or discoloration in the leg can indicate this condition and require immediate medical attention.

Other Serious Complications. Other serious and even life-threatening complications are rare but can include:

- Pulmonary embolism (blood clots that travel to the lung).
- Surgical injury of the urinary or intestinal tracts. (They are uncommon and most are recognized and repaired during the hysterectomy.)
- Abscesses.
- Perforation of the bowel.
- Fistulas (a passage that bores from an organ to the skin or to another organ).
- Dehiscence (opening of the surgical wound).

Long-Term Complications. Women who have had a total hysterectomy are at higher risk for the following long-term complications:

- Muscle weakness in the pelvic area.
- Prolapse (decent) of the bladder, vagina, and rectum if the muscle's walls are overly weakened. (This may require further surgery.)
- Bowel problems may develop if adhesions (extensive scarring) have formed and obstruct the intestines, sometimes requiring additional surgery.
- Shortening of the vagina is a possible complication specific to vaginal hysterectomy. It can cause pain during intercourse.

It should be noted that such complications are uncommon. In one study of 43 women, satisfaction was high, and none reported significant problems in the bladder or intestinal tract following hysterectomy.

Treating Menopausal Symptoms and Premature Menopause after Hysterectomy

After hysterectomy, women may experience hot flashes, a symptom of menopause, even if they retain

their ovaries. Surgery may have temporarily blocked blood flow to the ovaries, therefore suppressing estrogen release. If both ovaries have been removed in premenopausal women, the procedure causes *premature menopause* . Symptoms come on abruptly and may be more intense than those of natural menopause. Symptoms include hot flashes, vaginal dryness and irritation, and insomnia. A significant number of women gain weight.

Women should consider taking hormone replacement therapy (HRT) after surgery if their ovaries have been removed. [See Well-Connected Report #40, Menopause, Estrogen Loss, and Their Treatments .]

In premenopausal women, hormone replacement therapy is not needed if the ovaries are left intact. The ovaries will usually continue to function and secrete hormones even after the uterus is removed, but the life span of the ovaries is reduced by an average of three to five years. In rare cases complete ovarian failure occurs right after hysterectomy, presumably because the surgery has permanently cut off the ovaries' blood supply.

Psychologic and Sexual Concerns after Hysterectomy

Sexual intercourse may resume four to six weeks following surgery. The effect of hysterectomy on sexuality is unclear. In one major study, 70.5% of women had been sexually active before the procedure, which increased to 77.6% within the year afterward. Other studies have reported that up to 25% of women experience increased sexual drive. Nevertheless, some women report no change and other women report development of problems related to sexual function. For example, around 10% of women experience vaginal dryness, about 2% of women develop pain during sex, and another 2% also appear to lose capacity for orgasm.

Two procedures associated with hysterectomy may affect sexuality directly.

- If the cervix is removed, the clitoris located outside the vagina can trigger orgasm, but many experts believe that uterine contractions stimulated by sexual intercourse also cause a so-called "deep orgasm". Retaining the cervix may help to retain this sensation.
- Patients who have both ovaries removed may be at higher risk for loss of sexuality. Ovaries produce small amounts of testosterone (the male hormone responsible for sexual drive) even after menopause.

Testosterone Replacement. Testosterone replacement therapy may restore sexuality in women who experience a decline in sexual drive. Occasionally, oral or injection treatments can produce male characteristics such as facial hair and voice change. A slow-release pellet inserted every six months under the skin in the hip appears to reduce these side effects. A patch (Intrinsa) is also in development. Taking hormones long term almost always carries some risks, and it is not yet known what danger testosterone replacement may pose in women. Support groups and counseling can provide important help for this problem.

Surgical Procedures for Intestinal or Urinary Tract Endometriosis

Implants affect the urinary tract in up to 20% of patients. If deep endometriosis causes severe symptoms in the intestines or urinary tract, surgical excision of these implants may be necessary. Sometimes the surgeon will need to remove adhesions that have joined pelvic structures, such as the vagina and rectum. If a surgeon is experienced, laparoscopy may be used to remove urinary tract or bowel obstructions caused by endometriosis or adhesions, but conventional laparotomy is often required for complete surgical removal of endometriosis in the intestine or urinary tract. Almost any intestinal surgery is major and requires careful preoperative preparation to avoid infection. The operations take a long time, are technically difficult, and pose a risk for bleeding and infection. The recovery period is often lengthy.

Pap Smears

Annual Pap smears are recommended for all women with cervix intact who have reached the age of 18 or over or who have become sexually active. After a total hysterectomy, in which the cervix has been removed, a woman will still need Pap smears of the vagina, but because of the low risk of vaginal cancer, these tests usually do not have to be performed annually. The interval between Pap smears depends on the patient's risk factors as determined by the physician. Women with a history of abnormal Pap smears usually require annual screening. Women with a supracervical hysterectomy, in which the cervix remains, still need annual Pap smears. Annual pelvic and breast examinations are important for *all* women, including those with a total hysterectomy.

WHERE ELSE CAN HELP BE OBTAINED FOR ENDOMETRIOSIS?

The Endometriosis Association, 8585 N. 76th Place, Milwaukee, WI 53223. Call (800-992-3636) for a general information packet or (414-355-2200) for specific issues or (<http://www.endometriosisassn.org>). Considerable support from manufacturers of GnRH agonists, although, in general, has good information.

International Pelvic Pain Society, Suite 402 Women's Medical Plaza, 2006 Brookwood Medical Center Drive, Birmingham, Alabama 35209. Call (800-624-9676) or (205-877-2950) or (<http://www.pelvicpain.org>)

Endometriosis Research Center, 630 Ibis Drive, Delray Beach, FL 33444. Call (800-239-7280) or (<http://www.endocenter.org>)

RESOLVE, Inc., 1310 Broadway, Somerville, MA 02144. Call (617-623-0744) or (<http://www.resolve.org/>)

American Society for Reproductive Medicine (Formerly the American Fertility Society), 1209 Montgomery Highway, Birmingham, AL 35216-2809. Call (205-978-5000) or (<http://www.asrm.com/>)

This organization provides useful information, including *Clinic Specific Annual Report*. This valuable report gives the success rates of treatment for fertility centers around the country. They also publish the professional journal *Fertility and Sterility* and publications for consumers.

Fertility Research Foundation, 877 Park Avenue, New York, NY 10021. Call (212-744-5500)
Offers information on treatment, latest research on male and female infertility.

American College of Obstetricians and Gynecologists, 409 12th St., SW, PO Box 96920, Washington, D.C. 20090-6920. (<http://www.acog.com/>)

The American College of Obstetricians and Gynecologists (ACOG) has published a pamphlet, *Understanding Hysterectomy*, which outlines what constitutes a medically necessary hysterectomy and describes what the surgery involves. To request a copy, send a self-addressed envelope.

Hysterectomy Educational Resources and Services (HERS Foundation), 422 Bryn Mawr Ave., Bala-Cynwyd, PA 19004. Call (610-667-7757) or (800-750-HERS) or (<http://ccon.com/hers>)

The American Association of Gynecologic Laparoscopists, 13021 East Florence Avenue, Santa Fe Springs, CA 90670. Call (800-554-2245) or (562-946-8774) or (<http://www.aagl.com/>)

American Medical Women's Association, 801 North Fairfax Street, Suite 400, Alexandria, VA 22314. Call (703-838-0500) or (<http://www.amwa-doc.org/>)

National Women's Health Network, 514 10th St. NW, Suite 400, Washington, DC 20004. Call (202-347-1140)

Membership is \$25 per year and provides a bimonthly newsletter and access to information. Reports cost \$6.00 for members and \$8.00 for nonmember.

National Women's Health Resource Center, Inc., 120 Albany Street, Suite 820, New Brunswick, New Jersey 08901. Call (877-986-9472) or call (732-828-8575) or (<http://www.healthywomen.org/>)

Other Internet Sites

<http://www.endozone.org>: Sponsored by pharmaceutical company but has very interesting material, including a dialogue between two experts concerning medical versus surgical treatments.

<http://www.womenshealthalliance.com>

<http://forums.obgyn.net/endo/>

<http://www.womens-health.com>

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Review Date: March 2002

This Report Reviewed by:

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