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Management of chronic pelvic pain

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Chronic pelvic pain is discomfort or pain greater than 6 months in duration. It is, usually, of sufficient discomfort that it requires medical or surgical intervention. It represents a cost of over US\$3 billion in the USA, and accounts for a large percentage of visits to the gynecologist and surgical procedures performed, such as laparoscopies and hysterectomies. The most common gynecological causes of this pain are endometriosis, adhesions, interstitial cystitis and vulvodynia; however, the pain can be caused by systems in the body other than urogenital including gastrointestinal, musculoskeletal, urinary tract and psychological problems. Diagnosis is sometimes difficult and treatment is often frustrating. This article describes efficient ways to diagnose chronic pelvic pain and possible treatments depending on the cause of the pain.

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Chronic pelvic pain (CPP) is pain of greater than 6 months duration of sufficient discomfort requiring medical or surgical intervention [1]. In women, it often occurs in the reproductive age group. The discomfort is usually localized in the pelvis, the abdominal wall below the level of the umbilicus, the lower part of the back and the inner aspects of the thighs. One of the difficulties with CPP is the lack of specific characteristics. Seeking medical assistance from a gynecologist for chronic pelvic pain is a very common practice. It has been estimated that one in three women have had pelvic pain during their lifetime [2–4] and over 9 million women (15% of the adult female population in the USA) have been treated for chronic pelvic pain [2]. In the USA, 10–15% of all gynecological referrals are for pelvic pain [5] and it is estimated that 40% of all laparoscopies [6] and over 10% of hysterectomies performed by gynecologists are for CPP [4,5]. The estimated amount of money spent yearly on treating this painful illness is over US\$3 billion dollars [2]. Due to lack of specific symptoms, it can lead to unnecessary and additional work-ups (BOX 1).

Causes of chronic pelvic pain

CPP in women can originate from multiple sites. The major system areas in which problems can lead to this pain are (TABLE 1):

- Gynecological
- Gastrointestinal
- Orthopedic – musculoskeletal, myofascial
- Urinary tract
- Psychological
- Systematic

Gynecological

Endometriosis

Endometriosis has long been considered the major etiological cause of chronic pain in the majority of patients. It accounts for approximately a third of all laparoscopic diagnoses. Many of these patients respond to oral contraceptive agents or nonsteroidal anti-inflammatory agents initially, but over time, the discomfort returns and becomes progressively worse. There appears to be a connection between endometriosis and interstitial cystitis (IC) in patients with chronic pelvic pain [7–9]. Early studies had suggested that at least a third of patients with suspected endometriosis

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appeared to have IC [7]. More recent studies, however, have demonstrated that over 90% of these individuals with CPP with other symptom areas ruled out have endometriosis, IC or both [8–10].

Pelvic inflammatory disease

Pelvic inflammatory disease (PID) is a common cause of CPP in a population with a high prevalence of sexually transmitted disease. Approximately 30% of women with PID subsequently develop CPP [11].

Adhesions

Adhesions or scar tissue can form after surgery in the abdominal cavity or secondary to an inflammatory response (such as PID, endometriosis or ruptured cysts), and it can potentially be the cause of CPP. Often the discomfort will begin immediately after the surgical procedure or within several months [12]. It is uncommon for adhesions to be the major cause of this condition years after surgery, as they are usually formed at the time of surgery.

Adenomyosis

As a woman matures, occasionally the uterus develops a condition known as adenomyosis (usually seen in women 35–50 years of age). It is the presence of endometrial-type glands and tissues in the muscle wall of the uterus where it would not occur normally. It can exist without symptoms, can cause bleeding, pelvic pain or a combination of bleeding and pain. An NIH study demonstrated that even after treating endometriosis, pain persisted in patients who had coexisting adenomyosis [13].

Fibroids

Fibroids are leiomyomata of the smooth muscle of the uterus. The word leiomyoma comes from Greek, meaning smooth muscle tumor. They are very common in women. It is estimated that 20–30% of women in their reproductive years have fibroids. Fibroids grow during the reproductive time period, but, since they are hormonally sensitive, they tend to regress after menopause secondary to a diminution of estrogen. They are benign tumors and occasionally will be the cause of increased menstrual bleeding. They usually do not cause pain, but in certain circumstances they can cause pressure and pain [14].

Ovarian cysts

Ovarian cysts can occasionally be the cause of pelvic pain. It is not uncommon for a cyst to grow so slowly that it might not cause any symptoms initially. When an ovarian cyst grows more rapidly, there can be pain. When a chronic cyst such as an endometrioma is present, it can occasionally produce discomfort. Functional cysts are rarely a cause of CPP.

Pelvic floor defects & hernias

A hernia by definition is a protrusion of tissues that occurs through a fascial defect. In cases of CPP, a hernia can be found in the sciatic area, obturator canal, groin, spigelian (a hernia through defects in the transverse abdominal aponeurosis lateral to rectus muscle but medial to the spigelian line) or due to defects in pubocervical/rectovaginal fascia, which respectively leads to cystocele/rectocele formation.

Pelvic floor defects leading to prolapse can cause pressure and pain symptoms in some women. Many women with these problems will not realize that there were pressure symptoms until a correction has been performed. Pelvic pressure and discomfort along with visualization of prolapse were strongly associated with worsening stages of prolapse [15,16]. However, in another study this was not reproduced [17].

Pelvic congestion syndrome

This is an uncommon but usually overlooked cause of pelvic pain. It is caused by incompetent ovarian vein valves leading to dilatation similar to varicosities. Pelvic pain and heaviness are more severe premenstrually and exacerbated by coitus and prolonged standing. Pelvic congestion as a cause of CPP was first brought to light by Allen and Masters [18]. The symptoms and possible etiology of pelvic pain associated with pelvic congestion syndrome and pelvic floor defects were described by Quinn in a letter to the editor in the *American Journal of Obstetrics and Gynecology*. He postulated that the myofascial defects seen on clinical examination and exploratory laprotomy may be associated with what recent studies have demonstrated as aberrant nerve fibers in those individuals with CPP [19]. Treatment for this condition suggested by Allen is the repair of the lacerations and defects of the broad and uterosacral ligaments or a hysterectomy if the patient has minimal success or desires it [18].

Vulvodynia

According to the National Vulvodynia Association, vulvodynia is defined as a “chronic vulvar discomfort or pain, characterized by burning, stinging, irritation or rawness of the female genitalia in the absence of infection or skin disease of the vulva or vagina causing these symptoms”. It is sometimes intermittent, occasionally is only sensitive to touch but is often constant. Studies have demonstrated that vulvodynia can occur at the same time as IC in 10–24% [20–22] and it has been demonstrated that 68% of individuals who were refractory to the usual types of treatments for vulvodynia had concurrent IC (BOX 2) [23].

Box 1. The major symptoms of chronic pelvic pain.

- Pelvic pain
- Lower abdominal pain
- Back discomfort
- Lower urinary tract symptoms
- Dyspareunia
- Dysmenorrhea
- Vulvovaginal pain

Table 1. The most common causes of chronic pelvic pain by systems.

System areas	Conditions
Gynecological	Endometriosis, adhesions, pelvic inflammatory disease, ovarian cysts, fibroids, adenomyosis, vulvodynia, prolapse of pelvic organs
Gastrointestinal	Colitis, irritable bowel syndrome, diverticulitis, chronic constipation, tumors
Musculoskeletal	Disc disease, scoliosis, osteitis pubis, strain, hernia, entrapped nerves
Genitourinary	Urinary tract infection, interstitial cystitis (painful bladder syndrome), overactive bladder, urethral syndrome
Psychological	Physical and sexual abuse, depression

Gastrointestinal

Irritable bowel syndrome

Irritable bowel syndrome (IBS) is a chronic condition of constant or intermittent abdominal pain that is associated with bowel dysfunction, either constipation or diarrhea. Women are twice as likely as men to be diagnosed with it. Painful bowel habits are suggestive of IBS. It was diagnosed by its symptoms and by the Manning criteria in the past. These criteria include pain that is eased after a bowel movement, looser stools seen at the onset of pain, increased frequency of bowel movements when the pain begins, distention of the abdomen, feeling of incomplete emptying and mucus discharge from the rectum. A more recent list of these symptoms to validate the diagnosis of IBS is the Rome II criteria. This list of criteria, necessary to diagnose the problem, includes that the symptoms have occurred for 12 or more weeks in the past year, although not necessarily consecutively. The patient should have two out of the following three symptoms:

- Pain that is relieved when defecating;
- The appearance of stool changes with the beginning of pain;
- The frequency of bowel movements changes at the onset of the pain [24,25].

A total of 35% of patients in a CPP clinic have IBS [26].

Inflammatory bowel disease

This group of diseases consists of diverticulitis, ulcerative colitis and Crohn’s disease. The etiologies of these diseases are unclear, with viral, bacterial and genetic predispositions as possible causes. Diverticulitis is the obstruction and microperforation of diverticulum. Ulcerative colitis is inflammation and ulcerations in the top layers of the large intestines. Crohn’s disease involves inflammation of all layers of the intestines and healthy bowel can be found between sections of diseased bowel.

Chronic constipation

Chronic constipation is a condition that the practitioner must investigate the underlying causes to rule out systemic disorders, medication-induced constipation and obstructing lesions secondary to cancer and other causes.

Tumors of the bowel

Tumors of the bowel are numerous. Diagnosis is usually accomplished by examination, anemia found on routine blood work and colonoscopy. There are also different chemical markers that can help to differentiate the types of tumors.

Musculoskeletal

Frequently pain secondary to orthopedic problems can be diagnosed easily by a gynecologist and the patient sent to the appropriate physician, such as an orthopedic specialist or a physical therapy expert. Chronic pain may develop from repetitive strains to the body as a result of various activities or one’s occupation. The most common muscle groups responsible for CPP are the levator and piriformis muscles [27]. These problems ‘often contribute to the signs and symptoms of chronic pelvic pain’. The common causes include:

- Levator ani problems;
- The piriformis syndrome;
- Iliopsoas spasm; coccygodynia,
- Pelvic floor myalgia;
- Vulvodynia.

The most common muscle groups causing these difficulties are the:

- Iliopsoas;
- Piriformis;
- Quadratus lumborum;
- Sacroiliac joints;
- Obturator internus;
- Pubococcygeus.

The innervations of these muscle groups are usually between L1 and S3, but the referral is usually to the lower abdomen, groin, pelvic floor, lower back, anterior and posterior

Box 2. The main causes of chronic pelvic pain for patients seeing a gynecologist.

- Interstitial cystitis
- Endometriosis
- Adhesions
- Adenomyosis
- Ovarian cyst
- Pelvic congestion syndrome
- Vulvodynia

thigh, buttock, anterior and lateral trunk, lateral trunk buttock, posterior thigh buttock, pelvic floor, sacroiliac joint, coccyx, vagina and rectum. The symptoms of these varied muscle groups are different depending on which muscles are irritated or injured. The symptoms include: pain with hip extension and weight bearing; pain with standing, walking and sitting; pelvic floor pressure; and painful intercourse (TABLE 2).

Myofascial pain syndrome

Myofascial pain syndrome (MPS) is a painful musculoskeletal condition and a common cause of musculoskeletal pain. Even today, many physicians do not believe that MPS exists and many do not understand its symptoms and treatment. It is characterized by the development of trigger points that are locally tender and can be a referral of pain to other areas of the body. Trigger points are sensitive, painful areas in the muscle or the junction of the muscle and fascia. They are often associated with a taut band of muscle tissue. When pressing on a trigger point, pain will often be referred and felt elsewhere. Diagnosis is made by a competent physician working in this area including individuals comfortable with this diagnosis, physiatrists and neurologists (TABLE 2).

Genitourinary

Overactive bladder

A chronic urinary tract infection can, over a period of time, cause an irritated bladder that can manifest itself with pain, frequency, urge and other symptoms causing an overactive bladder. An overactive bladder without an infection can be due to unknown causes or be secondary to problems such as IC, nerve damage from surgery and trauma, bladder stones, side effects from medications, and neurological diseases, such as strokes, spinal cord problems, multiple sclerosis and Parkinson's disease. In these individuals, the layered, smooth muscle around the bladder spasms. This creates a situation where there is constant pressure and muscle contractions and occasionally translates into pelvic pain and pressure.

Interstitial cystitis

IC is a condition of unknown etiology that causes an increase in lower urinary tract symptoms and is often associated with pelvic pain. The amount of discomfort and symptoms vary greatly. Some individuals experience mild discomfort with pressure or tenderness and some may experience intense pain in the bladder and pelvic area. Often patients have mild to severe overactive bladder symptoms but sometimes, they exhibit no urinary symptoms. The intensity of discomfort can change as the bladder fills with urine or when it empties. Symptoms often flare with the menstrual cycle and pain is often unbearable during intercourse. Some researchers suggest a connection between endometriosis and IC in patients with CPP [8–10]. An early study suggested that at least a third of the patients with suspected endometriosis appeared to have IC [7]. Recent studies in those individuals who have had nongynecological and nonurological causes of CPP ruled out, have demonstrated that over 90% of these individuals have endometriosis, IC or both [8–10]. IC can be misdiagnosed by medical personnel as a recurrent urinary tract infection in women, even when the cultures are negative. A possible mechanism for pain that has been put forth is that the glycosaminoglycan layer is damaged allowing irritating solutes in the urine to reach the urothelium and damage the underlying nerves causing an irritation (FIGURE 1) [28]. Approximately 15% of patients with IC will have only pain [29].

Urethral syndrome

Urethral syndrome is now seen by many as a subset of IC. There may be times when this is secondary to an infectious disease, and treatment should be directed appropriately.

Psychological

Physical & sexual abuse

Up to 25% of women with CPP disclose a history of physical and sexual abuse [30,31]. Past traumatic experiences may alter neuropsychological processing of pain signals and can permanently alter pituitary–adrenal and autonomic responses to stress.

Table 2. Origin of neuromuscular pain.

Muscle group	Innervations	Referral	Symptoms
Iliopsoas	L1–4	Lower abdomen, low back, groin, anterior thigh and lateral trunk	Pain with weight-bearing and hip extension
Quadratus lumborum	T12–L3	Lower abdomen, sacroiliac joint, anterior lateral trunk, anterior thigh and buttock	Pain in lateral low back with walking and standing
Sacroiliac joints	L4–S3	Low back posterior thigh buttock and pelvic floor	Pain walking and standing
Obturator internus	L3–S2	Posterior thigh, pelvic floor, buttock and coccyx	Pelvic floor pressure
Piriformis	L5–S3	Low back, buttock and pelvic floor	Pain with walking, standing and sitting
Pubococcygeus	S1–S4	Buttock, pelvic floor, vagina and rectum	Pain with sitting and painful intercourse

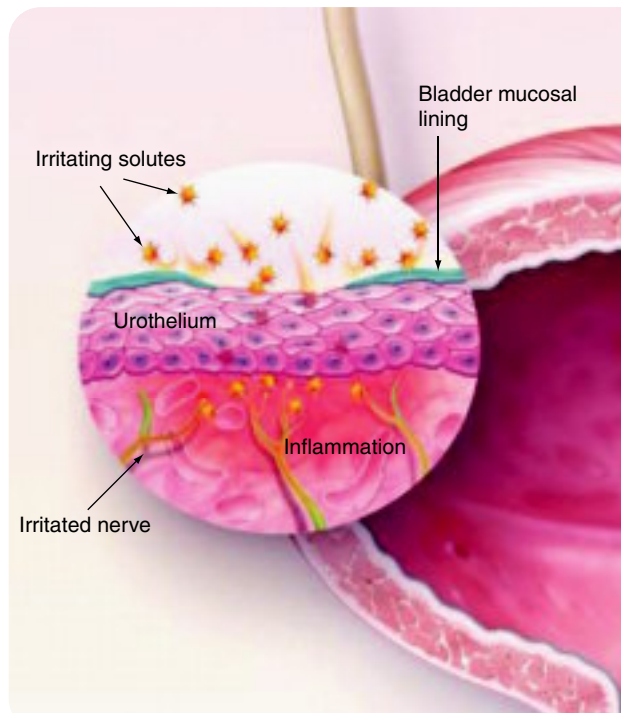


Figure 1. Bladder urothelium dysfunction may cause interstitial cystitis.

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Depression

Depression, which is prevalent in general the population, appears to occur more frequently in women suffering CPP. Some believe CPP is a variant of depression [32], while others believe that stressful experiences, such as childhood physical and sexual abuse, could cause both CPP and depression [33].

Systemic

Systemic diseases can occasionally cause pelvic pain in individuals. Usually they are diagnosed and managed by an internist. Some of these problems include: acute intermittent porphyria, abdominal migraine, systemic lupus erythematosus, lymphoma and neurofibromatosis.

Diagnosis in the gynecological setting

The diagnosis of CPP is sometimes elusive because several causes can often be found that might explain the pain; it is possible that one or all of the potential findings are important in the true diagnosis of the cause of the pain. Occasionally, the physician will stop when a condition is encountered and treat that problem. Often the treatment will be helpful but not totally cure the problem and sometimes the efficacy of the treatment wanes over time and the pain returns. Therefore, if one treats the pain and it is not totally successful or if the pain returns within a short interval of time, it is possible that the disease treated may have returned or that there are factors in addition to the original problem that need

to be treated. The gynecologist must rule out musculoskeletal, gastrointestinal, psychological and orthopedic problems by first examining the patient and investigating the possibility of these nongynecological diseases. If in doubt, a referral to a physician more attuned to these specific pathological states can be made.

History

A detailed medical history, if taken systematically, can usually direct the work-up towards the correct diagnosis. The characterization of the pain is important including: the nature, when it began, the intensity, the distribution and radiation, the cyclical changes and its coexistence with other symptoms in general (BOX 3).

Location

A scoring system called ‘Torso score’ is used by dividing the anterior abdominal wall and back into 30 different sectors. Pain is rated from zero to ten in severity, with ten being the worst pain possible. If a patient has a score of more than 30 or a pain level greater than seven in more than four areas, then these individuals often do not benefit from laparoscopy [34].

Periodicity of pain

Pain can be episodic with certain types of discomfort, such as miltleschmerz, or continuous, as with adhesions.

Exacerbating factors

Pain associated with sexual activity can be pain on insertion due to vaginismus or deep pain due to endometriosis. Pain secondary to sexual activity can be during, immediately after intercourse, or the following day. Pain worsening with prolonged standing or bending can be pelvic congestion syndrome or musculoskeletal in origin (BOX 4).

Review of previous therapies

A careful history of previous surgeries such as myomectomy or the drainage of a pelvic abscess might help with diagnosis. A history of previous diagnostic tests, medications and hormonal manipulation can guide the therapy and contribute to the future success of treatment.

Associated symptoms

It is useful to have the patient fill out questionnaires in areas such as pain, quality of life, review of systems, medicines being taken, surgeries previously performed, and specific inventories that help in the diagnosis, such as the PUF questionnaire (pain, urgency and frequency), a high score being suggestive of IC (BOX 5 & 6) [35].

Assessing nongynecological symptoms

Bladder and bowel symptoms are very important components of the evaluation. A detailed history of these factors may play an important role in guiding the physician. Psychological evaluation utilizing instruments, such as the Minnesota Multiphasic

Box 3. History from patient.

- Nature
- Beginning
- Intensity
- Distribution
- Characterization
- Localization
- Previous therapy
- Sexual history
- Radiation
- Coexistence
- Duration
- Cyclical
- Changes
- Exacerbating factors
- Associated symptoms
- History of physical or sexual abuse

Personality Inventory, the West Haven-Yale Multidimensional Pain Inventory and other tests, have proved to be useful in assessing CPP (BOX 3).

Physical examination

After a detailed history, an examination involving painful areas and areas from which referred pain can emanate are very necessary in the diagnosis of causes of CPP. The diagnosis of genitourological causes of CPP begins with a physical examination. An examination of the abdomen and pelvis allows the physician to determine the location of painful areas by palpation and allows finding cysts, hernias and/or musculoskeletal defects and masses that may be a cause of the patient's pelvic pain. The physician is able to check for suprapubic tenderness during the abdominal examination. Examining the vaginal vault to feel for levator muscle spasms or rectal spasms can be an important finding. As important is the finding of spasm or tenderness over the anterior vaginal wall, which sometimes creates the urge to urinate. This can be suggestive of an irritated bladder (BOX 7).

Abdominal examination

After a routine examination and palpation, the patient should be examined with her legs flexed, which will help in evaluating visceral pain, while re-examining the abdomen with legs extended will help to identify abdominal trigger points typical of myofascial pain syndrome. Having the patient tense her recti muscles by either straight leg raising or lifting the head off the table usually reduces the pain of visceral origin but exacerbates the musculoskeletal pain.

Back examination

Examining the posture, gait, the spine for signs of scoliosis and eliciting a range of motion and point tenderness can be very helpful with diagnosing discomfort of musculoskeletal origin.

Pelvic examination

The external genitalia should be examined for herpes or fistulae and the vulva especially for varices, suggestive of pelvic congestion syndrome. Utilizing a cotton swab, the vulvar area is touched to elicit pain, confirming the diagnosis of vulvodynia or vulvar pathology. Bimanual examination will help diagnose vaginismus if associated with spasm of muscles. Tenderness in the posterior fornix along with nodularity over uterosacral ligament suggests endometriosis, while a pelvis that is nonmobile can be a sign of scarred pelvic inflammatory disease. Diffuse fullness is often a sign of pelvic congestion syndrome. A bimanual exam will help diagnose adnexal masses and fibroids.

Suprapubic tenderness with or without urethral tenderness suggests an irritated bladder (BOX 7). Single digit palpation of the levator ani and piriformis muscles may demonstrate tenderness and spasm. Active contraction of these muscles (external hip rotation and Kegel's maneuvers) can be used to isolate these muscle groups in the pain disorder.

Ancillary investigations

Some additional investigations can be performed that may help elucidate the situation.

Radiological procedures such as a computed tomography (CT) scan and pelvic sonography may help rule out kidney stones, ovarian cysts, inflammatory bowel diseases and abdominal and pelvic masses. The presence of an enlarged uterus with invading endometrial glands is suggestive of adenomyosis. An magnetic resonance imaging (MRI) of the uterus can detect adenomyosis in over 90% of cases (BOX 8) [36].

Blood tests, such as STD screening for chronic PID, TSH for hypothyroidism presenting as depression along with CPP, Ca125 for fibroids and adenomyosis can be carried out. Urinalysis and culture and sensitivity of the urine may help distinguish between infectious and noninfectious bladder irritation, such as IC/painful bladder syndrome (PBS), which is often misdiagnosed as recurrent urinary tract infections despite negative urine analysis and cultures [37]. A potassium sensitivity test

Box 4. Factors affecting or modifying symptoms.

- Posture
- Defecation
- Sex
- Menstruation
- Sitting
- Urinary voiding
- Medications

Box 5. History of associations.

- Association
 - Anorexia
 - Constipation
 - Fatigue
 - Urgency and frequency
 - Dysuria
 - Dyspareunia
 - Dysmenorrhea
- Surgical history
- Obstetrical history
- Gynecological history

is used by many physicians in an attempt to delineate painful bladder problems. This test detects abnormal bladder permeability. There is a correlation with positive results to patients with IC [35,38,39]. When the test is positive, the patient experiences moderate-to-severe pain. Some individuals suggest that if the patient is already uncomfortable, that a 'rescue instillation' of a local anesthetic, sodium bicarbonate and heparin can be instilled into the bladder for 15–20 min. If the discomfort diminishes during or after the instillation, then a presumptive diagnosis of pain of bladder origin can be made.

A cystoscopy with hydrodistention of the bladder can be diagnostic and therapeutic. Most patients with an irritated bladder syndrome (IC and painful bladder syndrome) demonstrate glomerulations (pinpoint bleeding areas in the bladder wall) or ulcers on the bladder wall surface at the time of cystoscopy. The hydrodistention should be performed under anesthesia as it is very painful. If the distention is not performed while asleep, the distention may not be effective and the pathology may not be seen.

A laparoscopy of the abdomen and pelvis allows the physician to see the pelvic organs and abdominal structures. It is the gold standard for diagnosing endometriosis as the areas in question can be biopsied if necessary. Areas of endometriosis, adhesions, ovarian cysts, ovarian masses and enlarged uteri can be seen and often these pathologies can be treated or alleviated at the time of the diagnostic procedure.

Treatment

Treatment of CPP is best accomplished when all the underlying causes are found and treated. Treatment for only one or two of the causes found may still not produce the desired result or lead to the false assumption that the treatment plan is not working if the symptoms do not go away. If we proceed to treat each pathological entity detected, not knowing fully the amount of discomfort it contributes to the pain, we will have the best chance of eliminating the problem and improving the patient's quality of life. The major gynecological

causes of pain that are often detected in individuals with CPP are endometriosis, IC, adhesions, adenomyosis and ovarian cysts (TABLE 3).

Endometriosis**Surgical**

Endometriosis is often detected at laparoscopy. Diagnosis is most accurate when a sample of abnormal tissue is biopsied during the procedure for microscopic inspection; however, visualization of certain tissue characteristics carries a high probability of correlation to a microscopic diagnosis [40,41]. Treatment can be begun at the time of initial laparoscopy by removing the areas of endometriosis. All areas seen are usually excised, vaporized or fulgurated. If all areas appear to be removed, some physicians will treat with medication in an attempt to eradicate all nonvisualized disease; this is carried out in hopes of decreasing the chance of recurrence, or at least, delaying the reemergence of the endometriosis. If all the disease cannot be removed at the time of laparoscopy, hormonal treatment and/or major surgery including hysterectomy with bilateral oophorectomy can be performed.

Medical

Many physicians prefer not to treat endometriosis via the laparoscopic route. After diagnosis, or sometimes without a definitive diagnosis from a laparoscopy, many practitioners will treat endometriosis with oral medications. There are several major classes of drugs that affect the hormone status of the body and therefore alter the endometriosis. Progestagens (progesterone-like medications) work by creating a pseudo-pregnancy state causing a thinning of the endometrial lining of the uterus and, in addition, the ectopic endometrial-type tissue of the endometriosis. Follow-up is usually accomplished by looking for the return of symptoms and treating appropriately. GnRH analogs create a pseudo-menopausal state and the patient often undergoes symptoms of menopause including irritability, hot flashes and occasionally sexual dysfunction. Birth control pills are not an adequate or effective treatment for endometriosis.

Adenomyosis

The treatment of adenomyosis is difficult. Even when a definitive diagnosis of adenomyosis of the body of the uterus is present, it may not be related to the CPP the woman is experiencing. Medical treatment is not universally successful. Mild

Box 6. Evaluation of the female to evaluate bladder tenderness.

- Suprapubic tenderness
- Iliococcygeus (Levator) tenderness or spasm
- Rectal spasm or posterior vaginal wall tenderness
- Anterior vaginal wall tender (at bladder base)

Signs of bladder tenderness in patients with possible interstitial cystitis [23].

Box 7. Diagnostic studies.

- Ultrasonography
- Computed tomography scan
- Magnetic resonance imaging
- IVP
- Psychological inventories (BDI, Minnesota Multiphasic Personality Inventory, EPI)
- Pain inventories and scores
- Urine analysis and culture
- Torso score
- Endoscopy
- Hydrodistention
- Instillation/PST

BDI: Beck Depression Inventory; EPI: Edwards Personality Inventory; IVP: Intravenous pyelogram; PST: Potassium sensitivity test.

cases may respond to suppression with GnRH agonists during a 6 month treatment period, but often symptoms return after cessation of the medication. If the individual is younger and wishes the option of preserving her fertility, there have been reported cases of surgically removing an area within the myometrium where the adenomyosis appears to concentrate in an attempt to minimize symptoms and allow for a pregnancy [42]. This approach does not decrease the effects on other areas of adenomyosis within the uterus. The main treatment of adenomyosis, only to be used if it is the cause of bleeding problems or pain, is removing the uterus (hysterectomy). Abdominal or vaginal hysterectomies are the most common types of hysterectomy, but a laparoscopic supracervical hysterectomy can be carried out as a minimally invasive procedure.

Adhesions

Only uncontrolled trials provide evidence to support adhesiolysis as a treatment for CPP. Several controlled trials failed to support adhesiolysis as beneficial for CPP [43–45].

Hernia & pelvic floor defects

Repair of a hernia usually involves removal of the hernia sac and placement of mesh to reinforce the defective area. Use of mesh and defect-directed surgery is becoming standard in vaginal prolapse surgery.

Vulvodynia

Multiple treatments have been used for vulvodynia, including vulvar care measures, topical and injectable analgesics, anesthetics, oral antidepressants, and anticonvulsant medications, biofeedback, physical therapy, low-oxalate diet, calcium citrate supplementation and surgery. Newer treatments being used include acupuncture, hypnotherapy, nitroglycerin and botulinum toxin.

Pelvic congestion syndrome

Progesterone given orally can sometimes be helpful but definitive treatment is repair of dilated veins or a hysterectomy.

Gastrointestinal

Treatment of gastrointestinal problems may be coincidental with other treatments in some patients with CPP. Often it is wise to allow the gastroenterologist to treat these disorders.

Treatment for inflammatory bowel disease can include medications by mouth and enemas, steroids for flares and antibiotics (mostly for ulcerative colitis). IBS often consists of dietary modifications, medications including antispasmodics and serotonin inhibitors.

The treatment regimen for diverticulitis can be to have nothing by mouth, antibiotics and in rare circumstances and with recurrence, surgery. Chronic constipation is treated by several means, including using different laxatives, biofeedback, pharmacologic agents and in severe cases, surgery can be performed. The treatment of tumors is surgical removal followed by chemotherapy if necessary.

Musculoskeletal**Myofascial pain**

The treatment of pain secondary to myofascial problems can begin only after an accurate diagnosis is accomplished. Methods for managing this painful condition include trigger point therapy, spray and stretch technique, injection of trigger points, dry needle technique, chiropractic manipulation, physical therapy, exercise, altering nutrition and sleeping habits, eliminating stress, biofeedback and use of tricyclic antidepressants. Trigger point injections involve injecting a local anesthetic directly into the trigger points. Dry needling is the use of a needle, similar to trigger point injections, without injecting anything (possibly disrupting the trigger point). Spray and stretch technique is a stretching of the involved muscles using a vapocoolant spray to lessen the discomfort prior to stretching the muscle (achieved in physical

Box 8. Workup of the gynecological patient with chronic pelvic pain.

- History with questionnaires filled out
- Physical examination and necessary blood and urine tests
- PUF questionnaire
- PST test if deemed appropriate
- Rule out nongynecological problems such as GI, orthopedic and neurological problems – if patients have these difficulties, send to a specialist
- Imaging studies as necessary
- Endoscopic procedures

GI: Gastrointestinal; PUF: Pain, urgency and frequency; PST: Potassium sensitivity test.

Table 3. Various treatments for interstitial cystitis.

Categories	Treatments available
Oral medicines	Pentosan polysulfate sodium, amitriptyline, pain medicines, antihistamines, anticholinergics
Bladder instillation	Dimethyl sulfoxide, rescue, cocktails
Hydrodistention of bladder	80–90 cm hydrostatic water pressure, nerve alteration
transcutaneous electrical stimulation	Mild electric impulses to bladder area, sacral nerve stimulation implants
Dietary changes	Carbonation, caffeine, chocolate, spicy foods, citrus drinks, alcohol
Behavioral therapy	Stress reduction, bladder training, low-impact exercising, ceasing smoking
Surgery	Augmentation, cystectomy, new bladder, fulguration of ulcers

therapy). Chiropractic manipulation treatment is adjustment of the ligaments and can be helpful to some individuals with this problem. Physical therapy by a trained therapist keys in on certain areas and manipulates and stretches the muscles and ligaments. Exercise can help by affecting the area of concern with low-impact movement.

A tender or active trigger point after treatment or with rest will become latent. This quieting or lessening of the symptoms is the goal of treatment. The problem, however, can recur secondary to many stimuli.

Muscular/skeletal

Rectal massage, diathermy, sitz bath, muscle relaxants, injecting lidocaine/steroids and injecting botulinum toxin has been used to treat chronic pelvic muscle spasm. It is usually effective in 50–60% of cases. In case of failure, tricyclic antidepressants can be tried.

Direct electrical stimulation may improve muscle spasm by fatigue of muscle after sustained contractions. In case of symphysis or sacroiliac joint pain, surgical reunion of the joint has been tried [46].

The treatment of musculoskeletal difficulties is often having a therapist do appropriate physical therapy to the affected muscle groups. Treatments for the muscles groups may be considered to fall into these categories: physical treatments, electrotherapeutic treatments and manual therapy.

The purpose of physical treatments is to help increase joint and muscle flexibility, help injured tissue mend, and, of course, diminish swelling and pain. Ultrasound and diathermy, cold packs and ice massage, hot packs and baths, and whirlpool and water therapy are used for these treatments.

Electrotherapeutic treatments have been utilized for pain and swelling reduction, to help make the muscles stronger, aid in soft tissue healing and reduce muscle spasms. There are several means of giving electrotherapeutic treatments:

biofeedback, transcutaneous electrical stimulation (TENS), various forms of muscle stimulation, and systems used to help place medicine into the injured muscle tissue with the help of electric current.

Hands-on treatment increases range of motion and strength at the same time as helping to decrease swelling and pain. Massage treatment and moving the joints and muscles actively to stretch and stimulate are very common.

Psychological

Depression is common in women with CPP and warrants treatment. However, data regarding the efficacy of antidepressants in the treatment of pain in CPP are minimal [47,48].

IC/painful bladder syndrome

Treatments for IC are primarily aimed at ameliorating the symptoms that this entity produces. There is, at present, no cure for IC, nor is there any way to determine the amount of response to any particular treatment. Because of this, the key is minimizing symptoms. Even when symptoms disappear, they might return after days, weeks, months or years. Symptoms may wax or wane without explanation.

The most common treatments available currently for the treatment of IC/PBS are oral medicines, bladder instillations, hydrodistention of the bladder, TENS, dietary changes, biofeedback, self-help, Interstim and surgery (FIGURE 2).

Oral medications

Pentosan polysulfate sodium (PPS) is the only drug approved by the US FDA. In many patients, it improves the symptoms of the patients, but does not work uniformly on all individuals. The mechanism for improvement is not known, but it is speculated that it may repair the defects in the bladder wall or may allow the bladder to repair itself [49]. Its side effects are limited to some minor gastrointestinal upset and some reversible hair loss. In a small number of patients taking the medicine, liver function test may be altered; hence, it is important to monitor it. Medication can at times take up to 4 months or more to have an effect; it is therefore necessary to have the patients take the medicine for at least 6 months unless there are untoward effects. Although the recommended dose is 100 mg three-times daily, off-label use of up to 300 mg three times daily have been used, in an attempt to achieve symptomatic relief sooner (BOX 9).

Nonsteroidal anti-inflammatories may be important medicines for mild discomfort. Tricyclic antidepressants such as amitriptyline have been used to reduce pain (alter the wiring of the pain perception), decrease frequency, nocturia and urge (anticholinergic effects) and increase the capacity of the bladder. Sensitive individuals may feel tired during the day; therefore, many women take it at bed time. Gabapentin has been used extensively for the management of pain uncontrolled by any other medications [50,51].

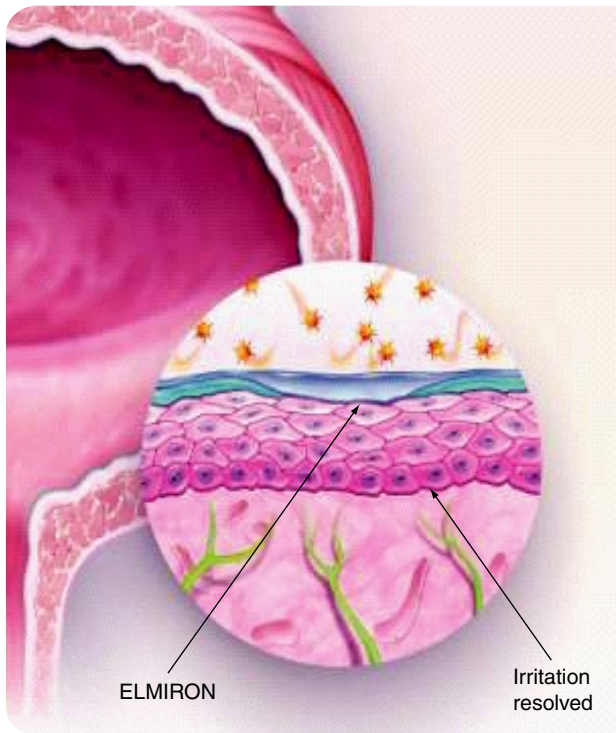


Figure 2. Pentosan polysulfate sodium (PPS) may help address an underlying issue. PPS (Elmiron) is believed to reinforce the protective bladder mucosal lining associated with the urothelium. Reproduced with permission from Ortho-McNeil corporation.

For those patients with an overactive bladder (urgency with or without leakage, frequency greater than seven times per 24 h) may benefit from antimuscarinic medications such as tolteridone (Detrol LA), oxybutynin (Ditropan XL), solifenacin (Vesicare), and darifenacin (Enablex). By decreasing the number of bladder contractions the pressure and discomfort produced by continuous muscle contraction may be reduced.

Bladder instillation

A bladder instillation is a procedure where the patient is catheterized and a small amount of fluid is placed in the bladder and bathes it for varying amounts of time before the patient voids and empties the bladder. The purpose is to reduce pain, alleviate the inflammation, and may reduce the muscle contraction leading to frequency and urge in the bladder. The only drug approved by the FDA for bladder instillation for IC is dimethyl sulfoxide (DMSO). The usual initial course of treatment is instillation one or two times per week for a course of 6–8 weeks. If helpful, it can be continued and titrated every 1–4 weeks. One can add agents to the DMSO and create a ‘cocktail’, which many practitioners believe work more effectively and for a longer duration of time. Some additional medicines added to the DMSO include local anesthetics such as lidocaine, steroids such as triamcinolone, bicarbonate to buffer the solution for a better effect on the bladder, and PPS or heparin to help the healing process.

A rescue instillation is a small amount of fluid that combines a local anesthetic such as lidocaine with bicarbonate to buffer and heparin. Its purpose is to reduce the strong level of pain caused by bladder irritation, often associated with a flare-up of pain. It can also be used when a patient first sees the physician for the CPP to see if treating the bladder reduces the discomfort. This can be utilized as a test of IC (if the pain abates or is lessened after instillation) in place of the PST test, which can cause severe pain.

Bladder distention

Hydro-distention of the bladder is a procedure that can help diagnose IC and in many cases can relieve or lessen the symptoms of painful bladder syndrome. The bladder is distended at a pressure of 80 – 90 cm of hydrostatic water pressure for several minutes. Distending the bladder at much higher pressures could potentially cause the bladder to rupture. This relief can last from a few days to many months. The mechanism of how hydrodistention works is not known; it is speculated that it may increase the bladder capacity and the pain indicators or nerve endings in the bladder are interfered with, allowing modification of signals to the brain. In a scarred bladder, it may be theoretically possible to cause a rupture, although the literature is lacking recent references.

Transcutaneous electrical nerve stimulation

These procedures deliver electrical stimuli to the bladder. Special devices are inserted into the vagina and the stimulation is computer controlled and programmed. It is postulated that the electrical pulses could possibly strengthen pelvic muscles that help control the bladder, increase blood flow to the bladder and promote the release of pain-blocking substances.

Sacral nerve stimulation implants (Interstim) are becoming more prevalent. Leads are placed through the S3 foramen in the back overlying the sacrum and buried under the skin. They are attached to a control center that is implanted in the buttock area with a battery that lasts from 5–10 years before replacement is necessary. This ‘bladder pacemaker’ can reduce frequency, nocturia and urge symptoms in those patients with IC who have symptoms that medication does not improve. Pain may be decreased in many patients and studies that are being performed currently are encouraging.

Box 9. The workup of the patient with chronic pelvic pain.

- History with questionnaires filled out
- Physical examination and necessary blood and urine tests
- Rule out nongynecological problems such as GI, orthopedic and neurological problems – if patients have these difficulties, send to a specialist
- Imaging studies as necessary
- Endoscopic procedures

Dietary changes

Although no concrete scientific evidence has been published, a change in certain dietary habits has been helpful to many individuals. There are many physicians and patients who believe that alcohol, spicy foods, chocolate, beverages that have caffeine and citrus and carbonated beverages may contribute to bladder irritation and inflammation. If avoiding these food sources is associated with improvement, then they should be removed and then reintroduced in lower amounts.

Behavioral therapy

Behavioral therapy includes stress reduction, bladder retraining, low-impact exercising and cessation of smoking. These behavioral modification treatments may be helpful in reducing symptoms, but they may, in addition, reduce the anxiety and tension that IC/PBS causes.

Surgery

Surgery is usually considered only if all other available treatments have failed and the pain is disabling. Multiple different approaches and techniques have been used.

Fulguration and resection of ulcers can be performed using cystoscopy. Fulguration involves burning ulcers with electricity or a laser. When the area heals, the dead tissue and the ulcer slough off, leaving new, healthy tissue behind. Resection involves cutting around and removing the tissue. Laser surgery in the urinary tract should be reserved for patients with ulcers and should only be carried out by doctors who have had special training and have the expertise needed to perform the procedure.

Augmentation is a procedure that enlarges the bladder. The scarred, ulcerated and inflamed areas of the patient's bladder are removed, leaving only the base of the bladder and healthy tissue. A piece of the patient's large intestine is resected and reconfigured as a pouch and is then attached to what remains of the bladder. After healing, the symptoms may improve, although there is a possibility of additional problems surfacing, such as infections and incontinence.

Flares & exacerbated symptoms

Frequently the symptoms of IC/PBS are exacerbated with increased pain and/or urinary problems. These flares can occur very infrequently (once in a while) or commonly (once or twice a month). Factors that appear to provoke flares include dietary agents, sexual intimacy and intercourse, the premenstrual and periovulatory time of the patient's menstrual cycle, allergies, physical and emotional stress and pelvic floor spasm [52–56].

Dyspareunia (painful intercourse)

Painful intercourse is a major problem for couples. This can cause serious strains on the marriage. Very frequently the male believes it is an excuse for not having intercourse. Several etiologies for this can be possible, including a combination of several problems. Endometriosis, interstitial cystitis, adhesions, vulvodynia, psychological and occasionally a retroverted uterus have

all been implicated in painful intercourse. The treatment for this problem may be multimodal and more than one treatment may be necessary at the same time.

Extirpation of the disease or hormonal treatment usually relieves symptoms and improves sexual function in those individuals with this problem. Adhesions can sometimes cause stretching of a pelvic structure or between two structures and cause dyspareunia from a mechanical force. Adhesiolysis can, therefore, lessen the problem and may ameliorate the pain.

Interstitial cystitis can cause the bladder to be sensitive to the impact of the penis during intercourse and causing pain at the time, immediately afterwards or the next day. Treating the bladder pain over time can improve the ability to have sexual intercourse with less discomfort.

Psychological causes of dyspareunia may cause problems affecting the vaginal muscles, the sensitivity of the fourchette of the vagina (opening of the vagina) or the lubrication mechanism. Childhood rape, sexual abuse or inappropriate touching can be signs of the need to see a mental health professional.

A retroverted uterus (a uterus that is 'tipped') is not an abnormal anatomical position for the uterus. Approximately a third of women have 'tilted' uteri. There is usually no problem for these individuals; occasionally, they may experience dysmenorrhea (painful periods), CPP and painful intercourse secondary to the impact of the penis to back of the uterus. Changing the position to women on top helps in some cases. Recently, there have been some studies on laparoscopic uterine suspension on individuals with retroverted uteri and painful intercourse secondary to this problem. The patients experienced significant pain relief with very few problems [57,58].

Behavioral treatment for IC

Many patients with uncomfortable symptoms of IC or IC flares utilize behavioral therapy to reduce or control these symptoms. Improvements in lifestyle including warm tub baths and attempting to reduce stress; these appear to help improve quality of life [59]. Bladder training associated with pelvic floor exercises and scheduled voiding may be beneficial for patients with minimal discomfort [60]. Counseling and group support is extremely important for psychological support, including information about the expectations and resources available to the patient with this problem. Dietary control and elimination of food sources that tend to exacerbate the condition is important [59,60].

Five-year view

Only recently has chronic pelvic pain been recognized as a major problem to be solved. In the past, many physicians would treat empirically, but the results were less than adequate. More and more healthcare personnel are beginning to understand the multimodal approach to this situation and within the next couple of years, diagnosis and treatment will be improved leading to more and better research.

Key issues

- Chronic pelvic pain (CPP) is a multidimensional problem that can be caused by one or multiple factors. All the possible factors contributing to the pain must be elucidated in order for it to be treated. The most common causes of chronic gynecological pelvic pain are: endometriosis; interstitial cystitis; ovarian cysts; adhesions; adenomyosis; vulvodynia; and pelvic congestion syndrome.
- Nongynecological sources of pain can also exist, together with the gynecological problems or alone. These include: psychological (physical and/or sexual abuse and depression); gastrointestinal (colitis, irritable bowel syndrome [IBS], diverticulitis, chronic constipation and bowel tumors); musculoskeletal (disc disease, scoliosis, osteitis pubis and muscle strain); and myofascial (hernias, entrapped nerves and fasciitis).
- After determining the cause or causes of these symptoms, treatment can begin. Treatment for each problem is often instituted and long-term treatment may be necessary. The following are possible courses for the major causes of chronic pelvic pain after nongynecological sources are removed.
- Endometriosis – optimally treated at the time of laparoscopy. May treat with medicine if not treated at laparoscopy or not treated completely.
- Interstitial cystitis – pentosan polysulfate sodium (Elmiron) for 6 months or more. Treat overactive bladder symptoms with anticholinergic medication. Possible bladder instillations.
- Adhesions – surgical removal.
- Adenomyosis – diagnose with magnetic resonance imaging (imaging) and at laparoscopy indent uterus with probe to see if it is 'boggy'. Medical treatment or localized myolysis is possible if the patient is young and desires future pregnancy; however, this is frequently not successful. Removal of the uterus (hysterectomy), if all other problems are excluded and it is felt to be the major cause of pain.
- Vulvodynia – frequently associated with interstitial cystitis/painful bladder syndrome. Treat all infections first and biopsy as necessary. Tricyclic antidepressants.
- Pelvic congestion syndrome – ovarian vein ligation.
- There are many recurrences after initial treatment success and new treatment courses may have to be instituted. CPP requires a multidisciplinary approach, including medical and surgical interventions, mental health provider pain consultants and physiotherapists.

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