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Prostatitis: Infection, neuromuscular disorder, or pain syndrome? Proper patient classification is key

ABSTRACT

Prostatitis is a broad term used to describe inflammation of the prostate that may be associated with a myriad of lower urinary tract symptoms and symptoms of sexual discomfort and dysfunction. The condition affects 5% to 10% of the male population and is the most common urologic diagnosis in men younger than 50 years. Prostatitis is classified into four categories, including acute and chronic bacterial forms, a chronic abacterial form, and an asymptomatic form. The bacterial forms are more readily recognized and treated, but symptoms in most affected men are not found to have an infectious cause. Indeed, chronic abacterial prostatitis (also known as chronic pelvic pain syndrome) is both the most prevalent form and also the least understood and the most challenging to evaluate and treat. This form of prostatitis may respond to non–prostate-centered treatment strategies such as physical therapy, myofascial trigger point release, and relaxation techniques. Because the various forms of prostatitis call for vastly different treatment approaches, appropriate evaluation, testing, and differential diagnosis are crucial to effective management.

DEFINITION OF THE CONDITION

Prostatitis is defined as painful inflammation of the prostate that is often associated with lower urinary tract symptoms (LUTS), such as urinary burning, hesitancy, and frequency, as well as with sexual dysfunction or discomfort, including erectile dysfunction, painful ejaculation, and postcoital pelvic discomfort; adverse sexual effects are reported in approximately half of men with prostatitis.[1,2]

National Institutes of Health classification system for prostatitis

Category I: Acute bacterial prostatitis

Category II: Chronic bacterial prostatitis

Category III: Chronic abacterial prostatitis/chronic pelvic pain syndrome, which is subdivided into IIIA (inflammatory) and IIIB (noninflammatory) disease

Category IV: Asymptomatic prostatitis (histologic or andrologic diagnosis)

The International Prostatitis Collaborative Network and the National Institutes of Health (NIH) have established a classification system for prostatitis.[3] The system's four categories, which are outlined in the sidebar above, describe acute and chronic infectious forms (NIH categories I and II) as well as the more prevalent forms that have not been correlated with infectious etiologies (NIH categories III and IV).

This article places particular emphasis on NIH category III, chronic abacterial prostatitis/chronic pelvic pain syndrome (CPPS), as it is both the most common form of prostatitis and the most challenging to evaluate and treat. Because NIH category IV prostatitis describes an asymptomatic form of this inflammatory disease, it is a diagnosis unlikely to be addressed in the primary care setting and is therefore addressed only briefly here.

PREVALENCE AND SOCIAL IMPLICATIONS

Population-based estimates of the prevalence of prostatitis in the general male population range from 5% to 10%.[4,5] In one study of health care professionals, the

* **Dr. Potts** reported that she has no financial relationships that pose a potential conflict of interest with this article. **Dr. Payne** reported that he has received honoraria, consulting fees, and an educational grant from Eli Lilly/ICOS for teaching/speaking, consulting, and contracted research; honoraria and consulting fees from Sanofi-Aventis for teaching/speaking and advisory board membership; consulting fees from Boehringer Ingelheim for teaching/speaking and consulting; consulting fees from Pfizer, Johnson & Johnson, and Thomson Healthcare for consulting; and consulting fees from Reliant Pharmaceuticals for serving on an advisory committee. He also reported having an ownership interest in and receiving consulting fees from MedVantx.

self-reported incidence of prostatitis was approximately 16%.[6] Prostatitis is the most common diagnosis coded in outpatient urologic consultations in men younger than 50 years.[7] However, bacterial prostatitis represents merely 5% to 10% of cases.[8] Recent international collaborations reveal comparable estimated prevalence rates in other populations, including in Europe and Asia.[9]

Chronic prostatitis has substantial economic impact. Men in the United States with chronic prostatitis incur direct and indirect costs averaging more than $4,000 annually, which is significantly greater than the annual medical costs associated with a number of other pain-related conditions frequently encountered in primary care settings.[10]

PATHOGENESIS

Although prostatitis is a relatively common urologic diagnosis, little is known about the pathogenesis of its most common form, chronic abacterial prostatitis/CPPS (NIH category III). Indeed, prostatitis experts have noted that NIH category III prostatitis has yet to be proven an infectious disorder or even a malady of the prostate itself.[3]

Acute bacterial prostatitis

Infection of the prostate occurs when bacteria-laden urine from the urethra refluxes into the intraprostatic ducts. Most of the infectious agents are from the Enterobacteriaceae family, specifically *Escherichia coli* and *Klebsiella* or *Proteus* species. These bacteria reflect the spectrum of organisms known to cause urethritis, urinary tract infection, or deeper genital infections. Other causative agents include *Enterococcus*, *Pseudomonas*, and *Staphylococcus* species as well as gonococcal organisms.

Recent catheterization, cystoscopy, or other instrumentation of the urinary tract may be a precipitating event. Urethral strictures caused by prior urethritis (typically as a result of gonococcal infection) can also increase the likelihood of infection. Risk of infection is increased in patients with impaired host defenses (eg, due to diabetes or human immunodeficiency virus infection). Men with spinal or neurologic disorders that impair the detrusor or pelvic floor musculature may be at higher risk. Other purported risk factors, such as trauma due to bicycle riding, sexual abstinence, and dehydration, have not been supported by well-controlled studies.

Chronic bacterial prostatitis

Chronic bacterial prostatitis is differentiated from acute prostatitis when bacteria continue to be isolated in prostatic fluid, even after appropriate antimicrobial therapy. The organisms can be cultured and localized to the prostate even in the setting of normal midvoid urinalysis and negative midvoid urine cultures. Chronic bacterial prostatitis is not usually suspected until a man experiences recurrent urinary tract infections, although clinicians must also consider persistent primary infections that were inadequately treated.

In contrast, chronic *abacterial* prostatitis is diagnosed when symptoms of pelvic or genital discomfort with or without LUTS persist for greater than 3 months in the setting of negative localized urine cultures.

Chronic bacterial prostatitis is more common in men older than 50 years and should be suspected when a man has *recurrent* urinary tract infections as proven by urine cultures. Risk factors are similar to those for acute bacterial prostatitis. Instrumentation of the lower urinary tract may be considered a risk factor, as catheterization or endoscopy can be a vector for bacterial seeding or can cause urethral strictures that could lead to reflux of bacteria-laden urine from the urethra to the prostatic ducts. Repeated isolation of the same organism (with the same susceptibility profile) in urine cultures is considered the hallmark of chronic bacterial prostatitis.

Chronic abacterial prostatitis/CPPS

The pathophysiology of abacterial prostatitis remains an enigma. Theories abound, and include nanobacteria, elevated prostatic pressures, voiding dysfunction and bladder neck dyssynergia (nonrelaxation of the external urinary sphincter during urination), male interstitial cystitis, pelvic floor myalgia, functional somatic syndrome, and emotional disorders. It is helpful to review what has been proven or disproven thus far.

The presence or absence of inflammatory cells in the expressed prostatic secretions (EPS) differentiates chronic abacterial prostatitis into category IIIA (inflammatory) or IIIB (noninflammatory) disease. However, this distinction is merely historical, and white blood cell (WBC) counts have not been shown to correlate with symptoms or with the presence or absence of infection.[11,12] Moreover, the relevance of abnormal WBC counts in the EPS is questionable, given the prevalence of abnormal counts in the EPS of asymptomatic men. In one study, for instance, 122 asymptomatic men underwent prostate massage for the retrieval of EPS during urologic consultation for elevated prostate-specific antigen (PSA) levels, and 42% of these asymptomatic men had abnormally elevated WBC counts in their EPS specimens.[13]

It has not been possible to histologically confirm a correlation between prostatitic inflammation and

symptoms. Histologic evidence of acute and chronic inflammation is identified in prostate pathology specimens with increasing prevalence over time, and the rate of identification can be as high as 90%. In a study of asymptomatic men without a history of chronic prostatitis, transrectal prostate biopsy (performed to evaluate elevated PSA levels) revealed inflammation in 50%.[13] However, in a separate study evaluating symptomatic men previously diagnosed with chronic abacterial prostatitis/CPPS, only 5% of cases demonstrated significant levels of inflammation by histology.[14] The tremendous discord between the findings of these two studies[13,14] underscores the importance of extending our focus beyond the prostate when evaluating men with symptoms traditionally attributed to an infected prostate.

Likewise, microbiologic studies do not support an infectious etiology. No correlation has been seen between symptom severity and the results of cultures to localize the area of infection with the Meares–Stamey 4-glass test.[15] (The 4-glass test involves collection of sequential urine specimens before and after prostate massage and of prostatic fluid during prostate massage.[16]) One large study found that normal controls were just as likely as men with chronic prostatitis to have positive localization cultures (incidence of 8% in both groups).[17] A randomized, placebo-controlled trial showed that 6 weeks of levofloxacin therapy for chronic prostatitis yielded no advantage over placebo,[18] and a subsequent trial found that neither ciprofloxacin, the alpha-blocker tamsulosin, nor their combination reduced symptoms of chronic prostatitis compared with placebo.[19]

Nickel et al followed 100 patients with chronic prostatitis over 1 year, during which time they received sequential monotherapies that included antibiotics, alpha-blockers, and antiandrogen therapies.[20] One third of patients showed modest symptom improvement, but only 19% experienced significant improvement (patients were not characterized in terms of NIH IIIA or IIIB subcategories).[20] One might argue that this response rate is even less than the expected placebo response, which begs the question, What are we really treating?

Asymptomatic prostatitis

The diagnosis of prostatitic inflammation can be made in asymptomatic patients as well. Such cases are usually identified in men who present because of infertility or are identified incidentally, through histologic findings obtained through biopsy or prostatectomy.

Initial evaluations for male infertility involve exclusion of genitourinary tract infections; however, many patients have no evidence of infection. Still, these patients may exhibit abnormally high WBC counts in the semen (leukocytospermia) or abnormally high levels of reactive oxygen species and oxidative stress. Although leukocytospermia is a known cause of oxidative stress, oxidative stress can be detected in the absence of high WBC counts.[21]

In the second setting, acute or chronic inflammation is detected in pathology specimens obtained through prostate biopsy performed to detect prostate cancer, transurethral resection of the prostate to relieve obstructive uropathy, or prostatectomy for treatment of benign prostatic hyperplasia or removal of cancer. This finding of inflammation is not uncommon, as it is seen in 50% of prostate biopsy specimens and as many as 90% of prostatectomy specimens.[22]

Because it is usually an incidental finding and is not correlated to symptoms, this form of prostatitis may not be considered clinically relevant. However, inflammatory changes within the prostate architecture may be the cause of PSA elevation, leading to false-positive readings and potentially unnecessary biopsies.[11] In one study, for instance, prospective detection of inflammation via examination of EPS before prostate biopsy (> 10 WBCs per high-power field), followed by 4 weeks of antibiotic treatment, led to normalization of PSA levels in 45% of patients.[13] It remains unclear, however, if this response was due to treatment of an underlying infectious process or to a nonspecific anti-inflammatory property of the antimicrobial agent.

Alternatively, interest is growing in the theory that inflammation may be a precursor to cancer, including prostate cancer. Investigators have noted that at least some high-grade prostatic intraepithelial neoplasias and early adenocarcinomas appear to arise from proliferative inflammatory atrophy. It is believed that inflammation and other environmental factors may lead to destruction of prostate epithelial cells, and increased proliferation may occur as a response to this cell death. The decreased apoptosis associated with these events may also be related to increased expression of Bcl-2, which is implicated in other malignant settings.[23] However, no data yet indicate a higher incidence of prostate cancer in patients previously diagnosed with specific NIH categories of prostatitis.

Additionally, a review of epidemiologic data has found prostatitis and sexually transmitted infections to be correlated with increased prostate cancer risk, and has likewise found intake of anti-inflammatory drugs and antioxidants to be correlated with decreased prostate cancer risk.[24]

PRESENTING SYMPTOMS

Acute bacterial prostatitis: Fever and severe LUTS

Patients presenting with acute bacterial prostatitis are usually febrile and suffering severe LUTS, specifically dysuria and urinary urgency, frequency, and hesitancy. At times, inflammation of the prostate can be so severe that patients present with urinary retention. Gross hematuria is not uncommon.

Chronic bacterial prostatitis: Asymptomatic spells between urinary tract infections

Men with chronic bacterial prostatitis are usually asymptomatic in between episodes of urinary tract infections; however, the organism can still be found and localized to the prostate. Episodes of urinary tract inflammation may occur with subtle LUTS but can also manifest with severe symptoms and urosepsis. Therefore, patients with chronic bacterial prostatitis may be at risk for recurrent urinary tract infections and bouts of acute prostatitis.

Chronic abacterial prostatitis/CPPS: Think beyond the prostate

Patients suffering from chronic abacterial prostatitis often complain of associated LUTS. Kaplan et al found that urodynamically proven voiding dysfunction is often misdiagnosed as prostatitis.[25] Other investigators have observed urodynamic abnormalities, including detrusor-sphincter pseudodyssynergia, which is characterized by nonrelaxation of the external urinary sphincter during urination. Normally, the external sphincter should exhibit relaxation during urination when sustained detrusor contraction takes place.[26,27] Although urodynamic testing has revealed voiding dysfunction previously diagnosed or misdiagnosed as prostatitis, clinicians must also consider these urodynamic abnormalities as components of the more accurately redefined and expanded diagnosis of chronic abacterial prostatitis/CPPS.

EVALUATION

Acute bacterial prostatitis: Exam is revealing, infection is readily identified

The history and physical examination are very revealing in acute bacterial prostatitis. A gentle digital rectal examination may reveal a soft, enlarged, boggy, and tender prostate. An overvigorous examination may cause undue pain and possibly increase the risk of bacteremia. If the gland is enlarged and abdominal examination shows a palpable or percussible bladder, urinary retention due to benign prostatic hyperplasia should be considered.

Infection is readily identified via a remarkable urinalysis demonstrating pyuria and organisms. Infection of the upper urinary tract may be differentiated from acute bacterial prostatitis by more prominent back pain and fewer or no LUTS. Blood cultures should be obtained to rule out bacteremia.

PSA testing is not recommended unless a nodule is present on digital rectal examination. Acute prostatitis can raise the PSA level, which often does not return to normal until 1 month after therapy; the free PSA remains low even 1 month after infection.[28]

One of the most serious complications of acute prostatitis is the formation of prostatic abscesses. Because catheterization of the urethra increases the risk of abscess formation, suprapubic catheterization is recommended in cases of associated urinary retention. Abscesses may be palpable during digital rectal examination but are typically identified by computed tomography (CT) in patients with persistent symptoms or fever.

Transrectal ultrasonography is not a routine part of the work-up for acute bacterial prostatitis.[29]

Chronic bacterial prostatitis: Confirm with localization cultures

Confirmatory tests for chronic bacterial prostatitis include localization cultures that involve retrieval of EPS via prostate massage **(Figure 1)**, such as the Meares-Stamey 4-glass test.[16] A simplified version of the 4-glass test is the "Pre and Post Massage Test" (2-glass test) popularized by Nickel.[30] It involves culturing a midvoid urine specimen before prostate massage along with a postmassage specimen (typically only 10 mL); the test is considered positive if there is growth of a single organism in the postmassage specimen, even if the midvoid specimen is sterile. The 2-glass test has a reported sensitivity and specificity of 91% each.[30] Because of the risk of possible contamination, results should be interpreted with caution and repeat cultures should be considered, if clinically feasible.

Evaluation for underlying causes is appropriate, and indications for evaluation are similar to those for acute bacterial prostatitis.

Chronic abacterial prostatitis/CPPS: Keep thinking beyond the prostate

Evaluation of the patient with suspected chronic abacterial prostatitis/CPPS should rule out risk factors for bacterial prostatitis, remote or recent trauma, exposure to a sexually transmitted disease, and instrumentation-induced inflammation.

History. Question patients about their occupation, with the aim of identifying any repetitive tasks that might affect the back and lower extremities, such as

long bouts of sitting at a desk or behind the wheel (eg, truck driving) or performance of physical labor. Ask about exercise regimens to reveal any improper techniques during weight training or inadequate warm-up or stretching.

Other findings from the history or physical examination can further support the multiple facets of CPPS, such as migratory abdominal or pelvic discomfort or cramping, urinary hesitancy, bowel irregularity, and nonrelaxation of the anal sphincter. Colorectal researchers have observed similar symptoms (eg, pain of the perineum, fullness, pressure, or the sensation of "sitting upon a golf ball") among men and women diagnosed with coccygodynia or levator ani syndrome.[31]

A psychosocial history should include a review of systems to reveal possible functional somatic syndromes, as psychological stress is common among men with prostatitis.[32] In some cases, a formal psychological evaluation should be considered.

Physical examination. The physical examination should devote special attention to the back, abdomen, and genitalia. If pain is present in the left lower quadrant, consider diverticular disease. An external and internal pelvic floor assessment should be conducted; for the internal evaluation, place the patient in the lithotomy position to allow assessment of the striated muscles of the pelvic floor by digital rectal examination.

Urinary retention often can be ruled out by percussion or palpation of the abdomen, with confirmation by ultrasonography or in-office Doppler imaging.

The anal sphincter and anal vault should be examined to rule out fissures, stenosis, and spasticity.

Consider myofascial pain. Various pain syndromes, particularly those of the pelvis, have also been described as myofascial pain syndromes. Muscles with myofascial trigger points exhibit increased responsiveness, delayed relaxation, referred spasm, and inhibition. The occasional patient may have associated autonomic dysfunction (similar to the unexplained bowel spasticity or urinary urgency/frequency syndromes). Painful contractions and referred pain are also characteristic of myofascial trigger point disorders.[33]

Sensitive examiners are able to detect taut bands, tender nodules, and even twitch responses in the affected muscle groups. While this may seem like a daunting task, physicians can begin learning about these techniques by consulting the manual on this topic by Travell and Simons.[33] Physical therapy workshops also can provide invaluable hands-on training. Like anything else, however, proficiency in these examination techniques requires special interest and practice. To successfully carry out this form of evaluation or therapy, clinicians must acquire a gentle confidence about these techniques.

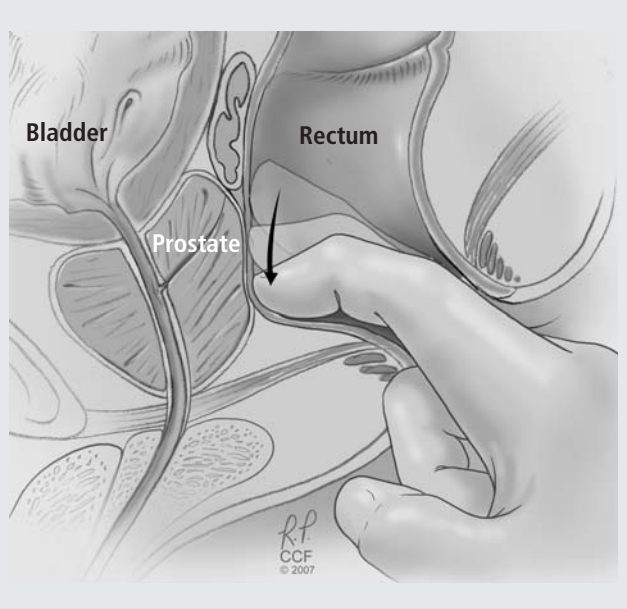

FIGURE 1. Technique for prostate massage to elicit expressed prostatic secretions (EPS) in the evaluation for chronic bacterial prostatitis. Gentle digital pressure is applied in movements along a lobe of the prostate for approximately 1 minute. Within 2 to 3 minutes after the massage, several drops of EPS should be secreted from the urethra. These secretions, together with the first 10 mL of urine after massage, represent the prostate's microbiologic environment.

DIFFERENTIAL DIAGNOSIS

As alluded to above, the differential diagnosis of acute bacterial prostatitis includes urinary retention due to benign prostatic hyperplasia and infection of the upper urinary tract. Urinary tract infection also figures into the differential diagnosis of chronic bacterial prostatitis, which explains the need for localization culture techniques as detailed above.

The differential diagnosis of chronic abacterial prostatitis/CPPS is more extensive, as outlined in **Table 1**, but begins with urinalysis and localization cultures to rule out infection.

TREATMENT

Acute bacterial prostatitis: Start with broad-spectrum intravenous antibiotics

Hospital admission is indicated for any patient with unstable vital signs, sepsis, or intractable pain. Other indications for admission include frailty,

TABLE 1
Differential diagnosis of chronic abacterial prostatitis/ chronic pelvic pain syndrome

Infection: Sexually transmitted diseases, chronic bacterial prostatitis, fungal infection

Gastrointestinal: Appendicitis, diverticulitis, constipation, anal fissures, hemorrhoids

Abdominal wall defects: Inguinal or ventral wall hernias, myofascial trigger points

Musculoskeletal: Neoplasm (primary or metastatic), degenerative joint disease of the hips, sacroileitis

Neurologic: Low thoracic or lumbar herniated nucleus pulposis, lumbar stenosis, Parkinson disease, diabetic cystopathy, demyelinating disease

Urologic: Renal calculi, varicocele, epididymitis, testicular neoplasm, interstitial cystitis

immunosuppression, diabetes, history or evidence of renal insufficiency, and poor social support.

Treatment should be initiated using a broad-spectrum antibiotic regimen similar to protocols established for acute febrile urinary tract infection. Ampicillin (or erythromycin for patients with penicallin allergy) and gentamycin are given intravenously until cultures confirm the organism and its susceptibilities, which will enable more specific antibiotic tailoring and early conversion from intravenous to oral therapy. Usually fever abates and LUTS improve within 2 to 6 days of intravenous therapy initiation.

The hospitalized patient may be converted to oral therapy after he has been afebrile for 24 to 48 hours and his blood cultures are negative. Oral fluoroquinolones are the treatment of choice for most cases, as they effectively target the usual bacterial pathogens in this setting. In otherwise healthy men, oral quinolones can be prescribed as the initial, and usually definitive, oral therapy. Weak bases such as trimethoprim will not concentrate well in the alkaline environment of seminal fluid, especially during infection, but because quinolones are neither pure acids nor bases, their concentrations in the prostate tissue compare favorably with their plasma concentrations.[34]

The choice of antibiotic for treatment of enterococcal prostatitis may differ and will be directed by the results of urine culture.

Duration of therapy varies in the literature from a minimum of 2 weeks to a maximum of 6 weeks. In our practice, we consider 4 weeks an appropriate treatment duration. However, when organism susceptibility profiles dictate the use of antibiotics other than quinolones or macrolides, we prefer a 6-week regimen.

We recommend avoiding any pain medications that could cause constipation or worsen urinary retention.

In cases of prostatic abscess, surgical drainage is usually required along with extended antibiotic therapy. In the case of microabscesses, there is evidence of resolution without surgical intervention, which can be observed via serial CT scans. Such close observation would be reserved for patients who exhibit consistent improvement but may require longer courses of antimicrobial therapy.

Chronic bacterial prostatitis: Base treatment on culture and sensitivity testing

For chronic bacterial prostatitis, treatment should consist of a 2- to 4-week regimen of appropriate antibiotics as dictated by culture and sensitivity testing of urine specimens from previous bouts of acute urinary tract infection and/or localization cultures that include mid-void and post–prostate massage urine specimens.

In the only study of antibiotic therapy for chronic bacterial prostatitis with long-term follow-up, ciprofloxacin was given for 4 weeks to men with localization cultures positive for *E coli*.[35] Three months after therapy, 92% of the men exhibited cure as demonstrated by negative EPS cultures and absence of symptoms. At 24 months after therapy, 80% of patients remained asymptomatic and had negative EPS cultures.[35]

Suppressive therapy is a consideration in men who have three or more recurrences per year. Suppressive therapy may be prescribed using one fourth or one half of the treatment dose at bedtime for antibiotics such as trimethoprim-sulfamethoxazole, trimethoprim, tetracycline, amoxicillin, or nitrofurantoin.

We have initiated suppressive therapy even when recurrences are less frequent than three times per year, due to the gravity of the recurrences. This tactic merits consideration in patients who have comorbidities that might lead to delayed diagnosis and treatment or in whom rapid progression to urosepsis has occurred, such as in the setting of diabetes or other states of immunocompromise. We also have recently implemented suppressive therapy in patients who are on chronic warfarin therapy, as 2- to 4-week antibiotic regimens can potentially elevate the prothrombin time and the International Normalized Ratio beyond therapeutic levels, requiring close monitoring and frequent alteration of the warfarin dose. With suppressive therapy, long-term predictability is more feasible since treatments are daily and long-term.

Chronic abacterial prostatitis/CPPS

General principles. From the outset, the management of patients with suspected chronic abacterial prostatitis should be guided by several general principles:

- Antibiotics should be avoided in patients who are afebrile and have normal urinalysis results.
- A brief course of anti-inflammatory therapy may be tried until urine localization cultures are completed. There is no clear evidence that any particular anti-inflammatory agent is superior to others in this setting.
- An empiric trial of alpha-blocker therapy can be considered, although the effectiveness of such therapy is uncertain, according to a recent systematic review of six randomized, placebo-controlled trials comprising 386 patients with chronic abacterial prostatitis.[36] While four of the six trials showed a statistically significant improvement in symptom scores with alpha-blocker therapy, two of these trials demonstrated no significant difference in quality-of-life scores. Of the remaining two studies, one showed no difference between alpha-blocker therapy and placebo and the other had limitations in statistical methodology. The authors noted that these trials used differing alpha-blockers (no head-to-head studies have been reported) and lacked uniformity in how they defined significant change.[36] Alpha-blockers may exert their effects to varying degrees at sites besides the prostate and bladder neck, which could potentially influence symptoms linked to receptor sites within the bladder or spinal cord.
- Contributing factors should be addressed, such as stress, overlapping syndromes, and neuromuscular factors.
- It is helpful to identify a team of physiotherapists who specialize in myofascial pain syndromes (discussed later in this section) and who are comfortable dealing with male genitalia and the pelvic floor.
- It is helpful to identify or establish a team of psychotherapists or social workers who address stressful life events and offer relaxation therapy. Referral to such providers must be presented as a part of the physician's comprehensive treatment approach so as not to discredit the patient's real physical suffering.

'Beyond-the-prostate' treatment options. In general, patients with chronic abacterial prostatitis/CPPS who are conscientiously evaluated and provided with a non–prostate-centric approach to their symptoms can sooner explore more appropriate management strategies, such as the following:

- Physical therapy
- Myofascial trigger point release therapy, which involves the methodical compression and massage of trigger points on the levator, obturator, adductor, and gluteal muscles or on the abdominal wall, and is performed by specially trained physiotherapists
- Relaxation techniques, including paradoxical relaxation therapy, which instructs patients to pace their breathing rate according to their heart rate and is usually taught by a psychologist or biofeedback specialist
- Thiele massages, which involve internal digital manipulation of the pelvic floor muscles, usually in a sweeping motion, parallel to muscle orientation.[31]

Such alternate therapies can be considered, however, only after appropriate evaluation and consideration of disorders affecting pelvic floor muscular function.

Pelvic floor myalgia has long been suspected as the cause of symptoms attributed to prostatitis,[37] but only recently has this suspicion been studied in a longitudinal fashion in urology. Using both a neurobehavioral component and a myofascial trigger point perspective for the evaluation and treatment of chronic abacterial prostatitis/CPPS, investigators at Stanford University studied 138 men who were refractory to traditional therapy.[38] All patients received at least 1 month of pelvic floor myofascial trigger point release therapy combined with paradoxical relaxation therapy and were subsequently assessed using a pelvic pain symptom survey and the NIH Chronic Prostatitis Symptom Index. By these measures, 72% of patients exhibited improvement consistent with clinical success as defined by the investigators. This case study analysis indicates that myofascial trigger point release therapy combined with paradoxical relaxation therapy represents an effective therapeutic alternative for chronic abacterial prostatitis/CPPS.[38] The significant response rate also helps to dispel the belief that this disorder is caused by an infectious etiology or prostate abnormality.

Similar response rates were seen when myofascial trigger point release therapy was prescribed to patients, mostly female, diagnosed with interstitial cystitis.[39] Of the 42 patients treated, 83% reported moderate to marked symptom improvement. The amelioration of urinary urgency and frequency and pelvic pain were attributed to the decrease in pelvic floor hypertonus.[39]

Interstitial cystitis and prostatitis share many characteristics: chronic genital and/or pelvic pain, LUTS, sexual dysfunction, disability, and reduced quality of life. As with prostatitis and CPPS, the approach to the management of interstitial cystitis has broadened in recent years and the condition itself is increasingly considered a painful bladder syndrome (see the article in this supplement devoted to interstitial cystitis/painful bladder syndrome).

NIH-supported research is under way to study the use of physical therapy and myofascial trigger point

TABLE 2
Indications for referral of patients with a history of prostatitis

Recurrent infection
History of urosepsis
Infection associated with gross hematuria
Persistence of microscopic hematuria after adequate therapy
Sterile pyuria
Abnormal testicular examination
Urinary retention
Abnormal digital rectal examination
Persistent fevers or night sweats

release therapy both in patients with chronic prostatitis/CPPS and in patients with interstitial cystitis/painful bladder syndrome.

Should treatment address an overlapping somatic syndrome? Patients with chronic abacterial prostatitis/CPPS incur increased medical costs that are not directly attributable to prostatitis. It may be that these patients are more susceptible to comorbidities. A retrospective chart review of men with chronic abacterial prostatitis found that 45% of them had psychological disorders and 65% met the criteria for other functional somatic syndromes, such as fibromyalgia, irritable bowel syndrome, chronic fatigue syndrome, and multiple chemical sensitivities.[40] This is a dramatic observation, as the lifetime prevalence of functional somatic syndromes in the general population is estimated to be much lower (> 4%).[41]

Similarly, a comparative study of 127 twins with chronic fatigue syndrome and their nonfatigued cotwins found that the prevalence of disorders such as fibromyalgia, irritable bowel syndrome, chronic abacterial prostatitis, pelvic pain, and interstitial cystitis was significantly higher in the chronically fatigued twins than in their co-twins.[42] In another study, patients with interstitial cystitis were found to be 100 times more likely than the general population to have inflammatory bowel disease, 30 times more likely to have systemic lupus erythematosus, and also more likely to have fibromyalgia, allergies, skin sensitivity, and irritable bowel syndrome.[43]

Because many of these diagnoses coexist, we might consider a more global overlapping syndrome, as specific somatic syndromes may be "largely an artifact of medical specialization," as argued by Wessely et al.[44] Certainly, this notion would be validating to the primary care provider, who may observe and intuit the overlapping nature of this phenomenon on a daily basis.

APPROPRIATE FOLLOW-UP

A single recurrence of a urinary tract infection in a man is suspicious for bacterial prostatitis and, as such, requires additional testing. Indications for upper urinary tract studies depend on the patient's history of surgery or renal calculi and the persistence of microscopic hematuria after treatment.

Lower urinary tract evaluation with a cystourethroscope is strongly recommended for all patients with recurrent infection or in whom hematuria, even microscopic, persists after treatment. This brief outpatient procedure, performed with appropriate antibiotic prophylaxis and local anesthesia, can be most helpful in identifying abnormalities that may be corrected to prevent subsequent recurrence or other pathologies such as bladder tumors, urethral strictures, bladder calculi, or diverticulae.

Adequate bladder emptying should be confirmed as well, using Doppler imaging or ultrasonography to measure the volume of urine remaining immediately following normal urination.

We recommend follow-up every 3 to 6 months to assess patient progress. It is also important for the patient to have a sense of commitment from the caregiver who is orchestrating the multidisciplinary approach.

WHEN TO REFER

Indications for referral are listed in **Table 2**. In general, because chronic prostatitis is a relapsing condition that is difficult to manage, referral of chronic cases to a urologist for comanagement should be considered. It is important to seek out urologists who are interested in and specialize in this diagnosis, as well as physical therapists who are comfortable with pelvic floor rehabilitation and familiar with myofascial pain syndromes. Because of the stress associated with the symptoms of chronic prostatitis and the tendency for many of these patients to "catastrophize," referral for psychological assessment should be considered.

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