The Diagnosis of Chronic Pelvic Pain: How Can We Detect Urological Pain?

Jung Ki Jo, Yong Tae Kim
Department of Urology, Hanyang University College of Medicine, Seoul, Korea

INTRODUCTION

Chronic pelvic pain (CPP) refers to pain perceived in the pelvic region for at least 6 months, although precise definitions across guidelines [1]. The European Association of Urology defines CPP as “nonmalignant pain perceived in structures related to the pelvis.” Pain must be continuous or recurrent over at least 6 months [2]. It is classified according to the organs involved as urological, gynecological, gastrointestinal, neurological, and musculoskeletal [2,3]. When urologists encounter patients with CPP, they should be able to discriminate urologic pelvic pain from other types. However, the diagnosis and classification of CPP are not easy because of the lack of clear diagnostic criteria, wide variation in presenting symptoms, absence of diagnostic tools, and coexisting symptoms due to accompanying other diseases. This concise review aims to help urologists diagnose CPP by focusing on identifying urological pain.

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DIAGNOSIS OF CHRONIC PELVIC PAIN

CPP is diagnosed based on the patient's symptoms, physical examination findings, diagnostic tests, and special studies of each organ. The location of the pain is determined by a clinical history and physical examination. Special studies of each organ determine the etiology of the pain within the involved organ. If a patient is diagnosed with a well-known treatable disease or a disease with a similar presentation, appropriate treatment is required [2,4-6] (Table 1). If not, the pain should be treated according to the guidelines for chronic pelvic pain syndrome (CPPS) [1-3].

Recommended diagnostic tests vary across guidelines, but all include urine analysis, culture, and cytology. Pelvic imaging studies such as computed tomography (CT) or magnetic resonance imaging (MRI) are recommended by East Asian guidelines [7,8] and the Canadian Urological Association (CUA) [5]. In our opinion, pelvic imaging studies may be helpful when a patient has hematuria, pain is poorly localized, or the patient has a history of pelvic surgery. This brief review is designed to help urologists diagnose CPP by focusing on identifying urological pelvic pain patients.
experiences visceral pain because of its vague characteristics, as described below.

**CHARACTERISTICS OF PAIN**

The characteristics of pain are the “key” to finding the involved organ. The location of pain that the patient experiences is the most important clue, but many patients cannot identify the location exactly. In addition, some patients present with symptoms other than pain, such as discomfort and pressure [4,9]. The characteristics of pain are helpful in identifying the etiology in these situations. The first step is to determine whether the pain is somatic or visceral, although many patients experience mixed pain [10].

Somatic pain is well-defined, sharp in nature, and localized to the area of pathology, but can be diffuse in its chronic stage due to peripheral and central sensitization [10]. Visceral pain is typically diffuse, poorly localized, and vague in nature, presenting as aching, cramping, or squeezing, and fluctuates in intensity, accompanied by exaggerated motor and autonomic reflexes [11]. These characteristics of visceral pain are due to the different nature of the receptors and the central organization of visceral nociceptive mechanisms. Many viscera are innervated by receptors whose activation does not evoke conscious perception. Not all visceral pathologies evoke pain, and some are not linked to visceral injuries [12]. The other characteristic of visceral pain is that it is referred to other, often remote, locations. The proposed mechanism is the convergence of nociceptive afferents on second-order neurons in the spinal cord. The referred pain is usually dull, aching, gnawing, and expanding. Referred pain is perceived in the somatic region at the same spinal cord level, with no neuropathic sign [13,14]. Visceral referral also occurs due to viscerovisceral convergence [3].

**UROLOGICAL PAIN**

Urological pain includes pain involving the bladder, prostate, urethra, penis, testicles, and epididymis [2,3]. Pain in the urethra, penis, testes, and epididymis is easy to diagnose because the pain is well-localized within the organ, which is usually tender on palpation. Clinical history and physical examination are sufficient, but ultrasonography and endoscopy may provide more information and are recommended in many guidelines [2,3,9].

Patients with bladder pain often complain of suprapubic pain, but also pain in other pelvic locations, including the urethra, vulva, vagina, and rectum, and extragenital locations such as the lower abdomen and back [15-17]. Thus, urologists cannot easily identify bladder pain based on the pain’s location. In definition, patients with chronic bladder pain, such as interstitial cystitis/bladder pain syndrome (IC/BPS), should have lower urinary tract symptoms (LUTS), such as frequency and urgency, or pain related to bladder filling [9,16]. However, LUTS are not a specific symptom. LUTS are highly prevalent, especially in elderly patients with LUTS and benign prostatic hyperplasia (BPH) and overactive bladder (OAB) [18]. Thus, physicians

### Table 1. Diseases with similar presenting symptoms and specific, treatable diseases

| Urinary tract diseases                  | Gynecologic diseases     | Others                        |
|----------------------------------------|--------------------------|-------------------------------|
| Bladder tumor                          | Endometriosis            | Inflammatory bowel disease    |
| Carcinoma in situ of the bladder       | Adenomyosis              | Irritable bowel syndrome      |
| Prostate cancer                        | Gynecological infection  | Nerve entrapment              |
| Urinary tract infection                | Gynecological malignancy | Coccydynia                    |
| Prostatitis                            | Pelvic congestion syndrome| Hip joint pathology          |
| Radiation cystitis                     | Pelvic adhesion          | Lumbar disc herniation        |
| Noninfectious cystitis                 | Intrauterine device      | Spinal stenosis               |
| Urinary tract stone                    | Vulvodynia                | Pelvic floor disorders        |
| Urinary tract obstruction              |                          | Myofascial pain syndrome      |
| Urethral diverticulum                  |                          |                               |
| Pelvic organ prolapse                  |                          |                               |
| Urinary retention                      |                          |                               |
should suspect the possibility of nonurological pelvic pain with a comorbidity of LUTS/BPH or OAB. However, the urgency experienced by IC/BPS patients is somewhat different from that experienced by OAB patients; the urgency of IC/BPS patients may be more constant and relieved on voiding [19]. However, the urgency of OAB is a “compelling desire to urinate that is difficult to postpone,” according to the International Continence Society definition [20]. Therefore, IC/BPS patients void to relieve pain, but OAB patients void to avoid incontinence [9]. Tenderness of the urinary bladder on physical examination is another clue for identifying bladder pain patients [21]. Thus, bladder pain can be diagnosed based on the nature of pelvic pain, tenderness of the bladder, and the presence of urinary frequency and urgency.

If the pain is suspected to be bladder pain, cystoscopy is helpful in distinguishing it from diseases with similar presentations, such as bladder tumors. Cystoscopy is also helpful for classifying IC/BPS with the presence/absence of Hunner lesions. With the patient in the lithotomy position for cystoscopy, a pelvic examination can be performed simultaneously to identify the trigger point and site for injection therapy. A potassium sensitivity test is not recommended [9]. Several biomarkers have been investigated with promising results for antiproliferative factors [22]. An anesthetic challenge test (intravesical instillation of lidocaine mixed with sodium bicarbonate) is recommended by the CUA and may have diagnostic benefits [5].

Patients with chronic prostatitis and CPPS (CP/CPPS) complain of pain in various locations, including the perineum, suprapubic region, testicles, or tip of the penis. Pain is typically felt during or at the end of voiding and/or ejaculation [23]. Prostatic pain is usually accompanied by urinary frequency and a sense of incomplete bladder emptying. The prostate is usually tender on rectal examination. Many guidelines recommend ultrasonography and endoscopy [2,3]. In men, the clinical characteristics of CP/CPPS and IC/BPS are very similar, and some patients experience both. In such cases, treatment options for both syndromes can be used simultaneously [24,25].

GYNECOLOGICAL PAIN

Gynecological or female genital pain includes pain of the vulva, vaginal vestibule, clitoris, uterus, ovary, fallopian tube, and adnexal tissue. Pain of external female genital organs can be diagnosed based on pain location and tenderness. Dyspareunia is common. Pain of intra-abdominal gynecological organs is usually accompanied by dysmenorrhea, abnormal menstrual bleeding, and dyspareunia, and is cyclic in nature. Motion tenderness of the uterine cervix may also be observed [17,18].

Endometriosis, pelvic inflammatory disease, and adhesions are common etiologies [2,6,11,26], although it is debatable whether adhesions are an etiology of pelvic pain. Pelvic ultrasonography, CT, MRI, or laparoscopy are recommended [3]. Neuropelveology deals with the evaluation and management of gynecologic pelvic pain [10]. Vulvodynia patients may complain of pain during urination when urine contacts the vulva, but the location of tenderness on physical examination may differentiate it from urological pain [21].

GASTROENTERIC PAIN

Gastroenteric pelvic pain is typically accompanied by gastrointestinal symptoms, such as painful defecation, constipation/diarrhea, and bloating [27]. The anus or rectum is tender on a rectal examination, if involved. Colonoscopy, ultrasonography, CT, or MRI is recommended [3].

NEUROLOGICAL PAIN

Neuropathic pain is pain due to neuropathy [3]. The nature of neuropathic pain is characterized by burning, throbbing, stabbing, tingling, stinging, shooting, or an electric shock-like sensation. Allodynia, such as paresthesia and dysesthesia, accompanies this condition. Tissue atrophy and skin changes are also possible [6]. A neurological examination [21], electromyography, a nerve conduction velocity study, diagnostic nerve block, ultrasonography, or MRI can be helpful [3].

Nerve entrapment syndrome, as an etiology of pain, may be overlooked. Nerves can be entrapped by scars from surgery, trauma, or childbirth. Pain is felt over the skin supplied by each nerve. Pudendal neuralgia is caused by entrapment of the pudendal nerve in Alcock's tunnel, and patients experience pain while sitting, which is relieved by standing or when in a supine position [6].

MUSCULOSKELETAL PAIN

Muscular pain is accompanied by altered muscle tone, muscle spasms, tension, and stiffness. Pain of the bone, joint, or ligament is related to movement or position. For example, patients with coccydynia experience pain when standing up from sit-
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Coccydynia is caused by coccygeal hypermobility [6]. A physical examination of the musculoskeletal system includes pelvic floor muscle palpation, forced flexion, abduction, and the external rotation test. Surface electromyography, dynamometry, real-time ultrasonography, elastometry, trigger point injection or needling, x-rays, or MRI is recommended [3,6].

SUMMARY

There are many guidelines for CPP and IC/BPS, with different definitions and diagnostic criteria, although all guidelines agree that it is a diagnosis of exclusion. The diagnosis can be made by history-taking, physical examination, and special studies of each organ. Pain should be characterized as visceral, somatic, or neuropathic. Aggravating factors, organ function, and prior surgical history are valuable for the diagnosis.

Urological pelvic pain can be diagnosed based on the location and nature of the pain and tenderness on physical examination. Bladder pain should be accompanied by LUTS and pain related to voiding. However, LUTS may be a symptom of another disease or syndrome, such as OAB or BPH. Thus, the possibility of other etiologies of pelvic pain should be excluded in order to diagnose bladder pain. Urologists can diagnose urological pelvic pain, if it is located in the urological organs, patients have urologic organ-specific symptoms, and the possibility of the pain originating in other organs is excluded (Fig. 1).

AUTHOR CONTRIBUTION STATEMENT

- Conceptualization: YTK
- Writing-original draft: JJ, YTK
- Writing-review & editing: JJ

ORCID

Jung Ki Jo  0000-0002-6080-7493
Yong Tae Kim  0000-0002-7646-2098

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