

Pinprick Testing Will Identify Pudendal Neuropathy in Patients with Chronic Pelvic Pain Syndrome

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Submitted: 10 Nov 2016; Accepted: 20 Nov 2016; Published: 25 Nov 2016

Abstract

This retrospective analysis discusses 25 consecutive males and 25 females, who had consulted at a clinical practice that focuses on chronic pelvic pain, beginning January 2, 2010. Sensory evidence of neuropathy was sought using response to light pinprick touch in the pudendal territory. Confirmation of neuropathy utilized neurophysiologic testing (not a part of this paper).

Purpose: *To report the ease of diagnosing pudendal neuropathy by searching for sensory response to light touch with a safety pin.*

Methods: *Both genders were examined for pudendal neuropathy using light touch with a safety pin. Normal sensation at the thigh (lumbar territory) was compared to the six pudendal branches (sacral territory). Six test sites are the glans (clitoris) the posterior scrotum (posterior labia) and the posterior anal skin. These sites evaluate the dorsal nerve of the penis (clitoris), the perineal nerve and the inferior rectal nerve. With each touch patients are asked to compare whether the pudendal response is the same as the thigh, has more pinprick sensation, less sensation, or none. Several additional neuropathic pelvic pain generators are also sought.*

Two neurophysiologic tests were performed; a warm temperature threshold detection test and a pudendal nerve terminal motor latency test.

Main findings: *Pinprick sensation is abnormal at one or more pudendal branches in 92% of males and 92% of females. Bilateral neuropathy is almost universal. Addition of the two neurophysiologic tests increased the diagnosis of pudendal neuropathy to 100%. 64% of the patients had additional neuropathic pelvic pain generators.*

Principal conclusions: *Pinprick testing can identify pudendal neuropathy in 92% of CPP patients. Changes from normal include chiefly hyperalgesia but also hypoalgesia and analgesia. These findings refute the erroneous declarations of the Nantes Criteria [1]. The presence of additional neuropathic pain generators in 64% of patients emphasizes the complexity of the CPP syndrome.*

Keywords: Chronic pelvic pain syndrome, Chronic perineal pain, Pudendal neuropathy, Neuropathic pain, Neurologic examination, Sensory examination.

Abbreviations: CPP: Chronic Pelvic Pain; PFCN: Posterior Femoral Cutaneous Nerve; MRI: Magnetic Resonance Imaging.

Introduction

The manifold symptoms of the chronic pelvic pain (CPP) lead to evaluations and treatments by several end-organ specialties. Each specialty takes possession of subsets of symptoms labelling them as “syndromes” i.e. irritable bowel, or vulvodynia or orchalgia or proctitis fugax. Symptoms may be given a spurious diagnosis such as “endometriosis” or “prostatitis”, implying that each process is a specific entity. However, similarities in symptoms of CPP

syndromes suggest a possible common basis. Evaluation of these patients in the authors’ practices often demonstrates that they suffer from the pudendal nerve syndrome (pudendal neuropathy). Our purpose is to inform all practitioners about a simple, rapid and inexpensive method of determining whether painful CPP syndromes are neurogenic vs. non-neurogenic. A sensory examination, using a safety pin, can demonstrate a common, neuropathic basis.

A tactile sensory evaluation using a safety pin is a practical method to immediately separate neuropathic symptoms from morphologic or inflammatory causes of chronic pelvic pain. A “definite” diagnosis of neuropathy can be made (a term used by the International Association for the Study of Pain (IASP) [2]. Our goal is to promote such definite categorization of a neuropathic basis of CPP and change clinical treatment algorithms and research protocols resulting in more specific, successful interventions.

Background

Pudendal neuropathy may cause serious CPP (pudendal neuralgia or the pudendal syndrome). It is a tunnel syndrome caused by compression of the pudendal nerve [3]. The most common site of compression is at the interligamentary space between the sacrotuberous and sacrospinous ligaments. A secondary site of compression occurs as the nerve traverses the Alcock canal - the space between the obturator internus muscle and its covering fascia [4]. The pudendal nerve is a mixed nerve commonly derived from fibers of sacral levels S 2, 3 and 4 but has many variations. Somatic and autonomic fibers may be damaged leading to a myriad of pain and pelvic organ symptoms and central sensitization. Diagnosis of pudendal neuropathy should be suspected from the clinical history, chiefly perineal pain that is (usually) aggravated by sitting and driving and often relieved sitting on a toilet seat [3]. Pains may also occur in the coccyx, genital, or suprapubic region. Bowel, bladder and sexual problems are common in patients with pudendal neuropathy earning the title of “the social nerve” and “the king of the pelvis”. Causes are typically youth athletics, adult exercise, falls, cycling, and Jobs requiring sitting. It may be caused by childbirth, radiation therapy or hip operations’ using a perineal post was with traction.

Pinprick sensation is recognized as a gross but effective method for evaluating for neuropathy. For centuries, neurologists have used pinprick testing to identify cutaneous neuropathy [5]. We have used this test in many hundreds of CPP sufferers in an experience exceeding 15 years. Findings of hyperalgesia or hypoalgesia or analgesia in any pudendal nerve branch distribution are diagnostic for pudendal neuropathy. Objective neurophysiologic tests are available to confirm pudendal neuropathy and will increase the diagnosis rate [6].

Pudendal neuropathy is a common, bilateral disorder, from our experience. The broad spectrum of possible symptoms leads to under diagnosis and, more often, misdiagnosis. As a tunnel syndrome, pudendal neuropathy responds to nerve protection, perineural blockade using bupivacaine and corticosteroids and, in a minority, pudendal nerve decompression [7,8].

Methods

50 consecutive individuals (25 males, 26 females) examined beginning January 2, 2010. They were, self-referred (n=8) or physician-referred (n=42) because of unrelenting pelvic pain that was unresponsive to conventional treatments/interventions. Our standard examination uses a safety pin to compare normal sensation of the thigh (lumbar territory) to the six pudendal nerve branches (sacral territory).

Pinprick sensation is tested at the glans (laterally) or clitoris for the dorsal nerve of the glans or clitoris. The posterior scrotum or posterior labia are tested for the perineal nerve. The inferior rectal nerve is examined posterior to the coronal midline of the anus which is the dividing boundary with the perineal branch (Figures 1 and 2).

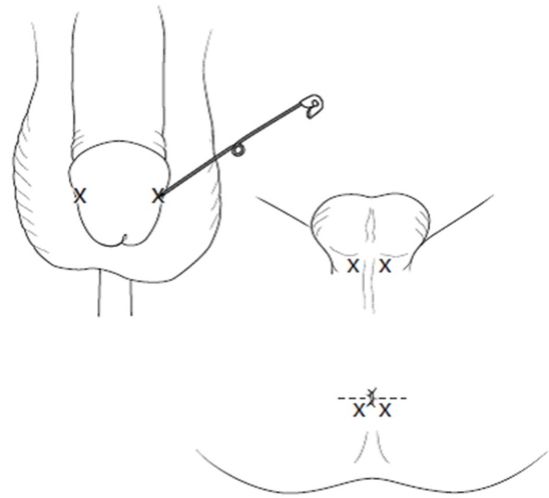


Figure 1: Sensory test site in male for pudendal neuropathy.

Light pinprick at the lateral glans measures dorsal nerve of penis; at the posterior scrotum measures perineal nerve; at the posterior anal verge measures the inferior rectal nerve. The glans is tested at the 3 and 9 o’clock positions to avoid normal sensory nerve overlap at the dorsum of approximately 1 cm.

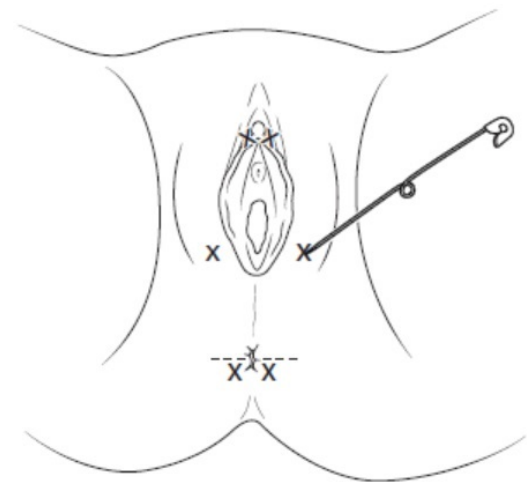


Figure 2: Pinprick test sites in female pudendal territory.

Light touch with safety pin at either anteromedial thigh for demonstration to patient of “normal”. Examine posterior labia (perineal nerve) prior to lateral side of clitoris. The inferior rectal branch is tested posterior to the coronal midline of the anus. At each site, ask if sensation is more pronounced (hyperalgesia) or less sensitive (hypoalgesia or analgesia) or the same as on the thigh.

Initially, the anteromedial thigh is touched lightly with the safety pin to demonstrate to the patient the “normal” sensation of pinprick. The examination proceeds to the posterior labia (perineal nerve) prior to toughing the lateral side of clitoris. The inferior rectal branch is tested posterior to the coronal midline of the anus. At each site, it important to ask if sensation is more pronounced (hyperalgesia) or less sensitive (hypoalgesia or analgesia) or

the same as on the thigh. After the sensory examination, two neurophysiologic tests were performed; the warm temperature detection threshold (NTE 2A Thermosensory Tester, Physitemp, Clifton, NJ USA) and the pudendal nerve terminal motor latency test (Sofomor Dantec Keypointe, Medtronic, Shoreview, MN USA).

Examination was also performed for several secondary neuropathic pain generators that surround the pudendal territory, overlap that territory and adversely affect the pain reduction of pudendal nerve treatments (Table 1). These include: abdominal cutaneous nerve entrapment, ilioinguinal and iliohypogastric neuropathies, the thoracolumbar junction syndrome, T-12 posterior perforating and posterior ramus tenderness, middle cluneal neuropathies and neuropathy of the perineal branch of the posterior femoral cutaneous nerves [9]. Inferior cluneal neuropathy is quite challenging to diagnose [10]. Results entered into an electronic health record required manual retrieval for this analysis.

Pudendal Neuropathy	Females	Males
Cutaneous sensory diagnosis	92%	92%
Diagnosis after neurophysiologic testing	100%	100%
Posterior ramus		
Thoracolumbar junction syndrome or posterior ramus syndrome (Maigne syndrome)	57.6%	11.6%
Middle cluneal neuropathy	56%	35.3%
T-12 Posterior cutaneous perforating branch	frequent*	frequent*
T-12 Posterior ramus	frequent*	frequent*
Anterior ramus		
Abdominal cutaneous nerve entrapment	15.4%	5.8%
Ilioinguinal-iliohypogastric unilateral	11.5%	35.3%
Ilioinguinal-iliohypogastric bilateral	38.4%	23.5%
Perineal branch of PFCN	occasional*	occasional*
Posterior femoral cutaneous nerve (PFCN)	occasional*	occasional*
Genitofemoral nerve	infrequent*	infrequent*
Inferior cluneal nerve	Uncertain. Specific diagnosis is difficult [6].	

Table 1: Multiple peripheral neuropathic pelvic pain generators in present cohort. *numbers unavailable due to inconsistent recording of findings in medical records.

Neuropathies of several peripheral nerves may cause pelvic pain in their primary distribution or through somatosensory reflexes or somatovisceral reflexes.

This article meets criteria for exclusion from Institutional review board review as the methods were standard practice techniques.

Results

Pudendal neuropathy is chiefly a bilateral disorder. Bilateral pinprick abnormalities were found in 100% of males (23 of 23) and 86.9% of females (20 of 23).

In females, pinprick testing was abnormal in 23 of 25 (92%).

Bilateral pinprick abnormalities were found in 86.9% of females (20 of 23). The number of pudendal nerve branches tested was 150 (6x25). Table 2 shows the results of pinprick in females. Hyperalgesia, the excessive pain response to a painful stimulus, was the most common response to pinprick testing. Abnormal site responses showed hyperalgesia in 43.3% of nerve branches, followed by normal responses (24%), then hypoalgesia in 18.7%, and analgesia in 14%. Pinprick was normal in 24% of nerve branches tested using the safety pin.

Number of responses		Right			Left		
		Clitoris	Labium	Anus	clitoris	Labium	Anus
Hyperalgesia	65	14	10	11	8	12	10
Normal	36	2	8	7	6	6	7
Hypalgesia	28	7	4	2	9	4	2
Analgesia	21	2	3	5	2	3	6
# of sites abnormal Total 114	Total sites 114/150 76%	23 (92%)	17 (68%)	18 (72%)	20 (76%)	20 (76%)	19 (72%)

Table 2: Pinprick responses compared to thigh: dorsal nerve of clitoris, perineal nerve (posterior labium) and inferior rectal nerve. Females (n=25) at six pudendal nerve branches = 150 test sites in pudendal territory.

In males, pinprick response was abnormal in 23 of 25 patients or 92%. All males had bilateral sensory changes (23 of 23). The number of branches testing abnormal was 107 of 150 branches, or 71.3% (Table 3). The most commonly damaged branches were the glans, then perineum, then inferior rectal. Abnormal site responses showed hyperalgesia in 43.3% hypoalgesia in 16%, and analgesia in 10.7%. Pinprick was normal in 28.6% of nerve branches tested by pinprick.

Number of responses		Right			Left		
		Glans	Perineum	Anus	Glans	Perineum	Anus
Hyperalgesia	65	8	12	7	14	15	9
Normal	36	8	6	10	5	6	8
Hypalgesia	28	4	3	5	5	1	6
Analgesia	21	5	4	3	1	3	2
# of sites abnormal Total 107	Total sites 107/150 (70.7%)	21 (84%)	19 (76%)	15 (60%)	20 (80%)	19 (76%)	17 (68%)

Table 3: Pinprick responses compared to thigh in males at six pudendal nerve branches: dorsal nerve of penis, perineal nerve, and inferior rectal nerve. 25 men with 6 sites tested = 150 sites. 107 sites abnormal (70.7%).

Pinprick testing identified pudendal neuropathy in 46 of 50 patients. The four patients with normal sensory examination were diagnosed on the basis of abnormal neurophysiologic testing. The neurophysiologic testing is not an integral part of this paper except to note:

- When pinprick testing was normal (4 of 50 patients).
- The pudendal nerve terminal motor latency test was abnormal in one of the two males and both females with normal pinprick testing.

- The warm temperature detection threshold test was normal in three and abnormal in one male.

Asymmetric pinprick sensory abnormalities are typical in our patients. For instance, a patient might be normal at one labium but abnormal at the opposite labium. Completely symmetrical abnormalities (3 sites bilaterally) occurred in five female patients and in none of the males. Any combinations of responses can occur in the same individual including normal, hyperalgesia, hypoalgesia or analgesia. The dorsal nerve of the penis and/or clitoris is most commonly damaged.

Discussion

American practitioners are not trained to recognize pudendal neuropathy. Most CPP patients undergo repetitive tests, endoscopies and expensive imaging studies [8]. When no abnormalities are found to explain the symptoms, practitioners often respond by discounting complaints, are less inclined to help, and suggest somatization [11]. The demeaning statement that the pain “is in your head” is all too often heard by these patients. The “lack of medical evidence” following conventional tests and imaging is due to lack of testing for neurogenic causes of the CPP. “What the eye doesn’t see, and the mind doesn’t know, does not exist” [12].

The exigency for sensory testing is the risk for misdiagnosis of CPP when the pudendal syndrome (pain, incontinence, irritable bladder/bowel, sexual dysfunctions) is overlooked. Confounded by the symptoms, practitioners may offer prolonged antibiotic and hormone treatments. Clinical tragedies occur when CPP is treated with multiple pelvic operations on females, unnecessary scrotal operations in males or even radical prostatectomy for pain. In 1991 Costabile stated that his patients had multiple diagnostic and surgical interventions with few positive findings. Furthermore, there was little improvement in the patients despite multiple previous surgical procedures [13]. Ramsden, a physician himself, tabulated his multiple, fruitless evaluations and treatments before the senior author of this paper used pinprick sensation to make his diagnosis [8].

Patients presenting with failed sacral nerve stimulators often have sensory evidence of pudendal neuropathy [14]. This expensive intervention is used as an off label treatment for pelvic pain [15]. Unfortunately, after three decades of implantations, the evaluation algorithms for sacral nerve stimulation do not mention sensory or motor evaluation of the pudendal territory prior to implantation [16,17]. Because 58% of our patients have voiding complaints, the question arises whether neuromodulation should be performed for any voiding symptoms without thorough testing in the pudendal territory.

We consider the sensory testing as crucial in the diagnostic methodology for CPP. Using pinprick, a physician/provider has six chances to diagnose pudendal neuropathy. The International Association for the Study of Pain recommends pinprick sensory examination as the basis for diagnosis of neuropathic pain [18]. Using pinprick examination, Zeulzer in 1915 diagnosed pudendal

neuropathy in a female cohort with pain, voiding complaints and normal urine [19]. Their symptoms are commonly called interstitial cystitis in the USA. Women with vulvodynia had pinprick responses of hyperalgesia, hypoalgesia or analgesia at the clitoris, posterior labia or posterior anal skin that indicated pudendal neuropathy [20]. Adoption of this simple examination by multiple specialties would significantly change individual patient care. Moreover, pinprick sensory examination in CPP research protocols could rapidly separate neurogenic pain from non-neurogenic pelvic pain. This categorization would allow more efficient use of diagnostic modalities and provide specific interventions affecting the peripheral neuropathies; precision medicine in the 21st century.

Complementary neurophysiologic tests are simple and allow any physician to increase the likelihood of diagnosing pudendal neuropathy. Warm detection threshold test evaluates unmyelinated C-fibers. These fibers are involved with pain signaling and autonomic function signaling. The pudendal latency test evaluates motor fibers. Each test is independent of the others. A change in pinprick sensation has no bearing on the response to warm temperature testing or the latency test. The pinprick also evaluates some A-delta fibers (stretch). The emotional consequences of pudendal neuropathy may be significant. Suicides are reported by bloggers and website managers. Pelvic pain has health impact similar to acute myocardial infarction, acute unstable angina and ulcerative colitis [21].

Treatment of pudendal neuropathy can be successful, initially using a nerve protection program, gabapentin and amitriptyline [8,9]. All providers can treat using this initial step. Physicians will need committed interventional radiologists and pain doctors to perform pudendal nerve perineural injections of corticosteroid medications and bupivacaine [22,23]. As a tunnel syndrome, approximately 30% to 35% of our patients require decompression surgery after failure of conservative measures to relieve pain or organ dysfunction. Physicians will need their surgical consultant to be familiar with the technique of pudendal nerve decompression and transposition [5,24]. In the USA pudendal surgery is performed by urologists, gynecologists, neurosurgeons and a plastic surgeon.

Broad application of pinprick testing is needed to measure the incidence and prevalence of pudendal neuropathy. Clinical research protocols for CPP should be changed to require pinprick sensory examination in all subjects. An example would be the research project sponsored by the National Institutes of Health called the “Multidisciplinary Approach to the Study of Chronic Pelvic Pain” [25]. This project is disbursing 38.5 million dollars in grants over a five year period. It is gathering significant patient data including imaging, tissues specimens and blood samples. However, its protocol does not include use of any pudendal sensory examination or neurophysiologic testing. Inclusion of these simple, inexpensive tests might guide the researchers to a definite neuropathic diagnosis and appropriate treatment protocols.

Pudendal neuropathy, diagnosed by finding sensory abnormalities,

represents a definite neuropathy. The findings in this study and results of examinations in a few thousands of our additional patients are contrary to erroneous claims in the Nantes criteria that an “essential finding” in the diagnosis of pudendal neuropathy is pain with no objective sensory impairment [2]. That group considers any sensory impairment as resulting from sacral root, cauda equine or sacral plexus lesions. Our contrary experience notes that after hundreds of MRI studies of the lumbar and sacral spinal cord and nerve roots, we have seen only one case of a sacral cord tumor causing perineal pain with analgesia of the perineum. The Nantes criteria are misleading.

Conclusions

Chronic pelvic pains may represent pudendal neuropathy. Concurrent bowel, bladder and sexual dysfunctions may occur and the term “pudendal syndrome” can be applied to this inclusive entity. Examination with a safety pin can compare normal sensation at the medial thigh with responses in the dorsal nerve of the clitoris (penis), the perineal nerve and the inferior rectal nerve. Finding of hyperalgesia, hypoalgesia or analgesia will confirm suspicion of pudendal neuropathy. 92% of patients had abnormal pinprick testing in the pudendal nerve territory. All patients had confirmation of pudendal neuropathy using a warm detection threshold test (a quantitative sensory test) and the pudendal nerve terminal motor latency test. Clinicians and researchers should routinely perform pinprick sensory testing in all patients with pelvic pain.

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