

REVIEW

A Review of Techniques used for Evaluating Lower Urinary Tract Symptoms and the Level of Quality of Life in Patients with Chronic Pelvic Pain Syndrome

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Although the prevalence of CPPS is somewhat uncertain, the cost to society in order to manage it is huge. CPPS presents itself with a variety of symptoms attaining multiple systems. The symptoms and discomfort have been evaluated using questionnaires (e.g. MPQ-DLV, PDI, NIH-CPSI, ICSI, and PUF). Diverse scores per symptom have been found using different questionnaires. Therefore, results from one questionnaire are not indicated taking overall conclusions concerning pain intensity and QoL. Instead, the scores for bladder symptoms showed more corresponding results. No gender difference has been found in questionnaire based symptom scores. Women with CPPS are less sexually active and have a higher impact on the QoL compared to men. The result of treatment, will greatly depend on an accurate diagnosis. A thorough clinical assessment using a 'four step plan' with special attention to the musculoskeletal system is very valuable. The physical examination including palpation and neurodynamic assessment can help indicate pain points and peripheral neuropathies. Constant current perception threshold (CPTs) in healthy volunteers showed that all CPTs in women were lower compared to men. But determining normative CPTs proved problematic: A weak intraclass correlation has been shown with one week interval. Both for the pudendal and the median nerves deviating values in healthy volunteers using sinusoidal stimulation have been found. Our normative CPTs showed almost no agreement with control groups in other studies. The search for a reliable and reproducible semi-objective evaluation of sensory function in CPPS patients must be continued.

Keywords: Bladder pain syndrome; Chronic pain; Chronic Pelvic Pain Syndrome; Gender; Electric stimulation; IC/BPS; Interstitial Cystitis; Lower Urinary Tract Symptoms; Median nerve; Neurometer; Neuropathy; Prostatitis; Pudendal nerve; Quality of Life; Questionnaire; Sexual; Sine wave current; Threshold

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Introduction

Chronic pelvic pain syndrome (CPPS) is characterized by persistent or episodic pain in the pelvic area. The pain is mostly associated with symptoms suggestive of organ dysfunction (e.g. lower urinary tract, sexual, bowel and/or gynaecological). A history of persistent genitourinary pain in

the absence of a proven infection or other obvious pathology is the keystone for diagnosis^[1,2].

Evaluation of diagnostic techniques for symptoms and for determination of the Quality of Life (QoL) in CPPS is important (e.g. questionnaires, physical assessment, sensory function)^[3].

Prevalence of CPPS

Prevalence figures of CPPS in literature vary widely. The condition is probably underestimated^[3]. Very often different criteria are used determining CPPS, different ways of evaluation applied and different patient groups included^[4]. The exact prevalence of bladder pain syndrome (BPS) remains thus uncertain^[3, 5].

Economic importance of chronic pelvic pain and bladder pain syndrome

In women in the U.S. (study with 5263 participants), the prevalence of chronic pelvic pain has been estimated at 14.7%. In 61% the etiology of the pain was unknown. For the U.S. population of women aged 18-50 years, the direct medical costs for outpatient visits for CPPS is estimated at \$ 881.5 million per year without 'out-of-pocket' expenses. The estimated total annual direct cost is \$ 2.8 billion. Fifteen percent among employed respondents (n = 548), reported time loss from paid work. Forty five percent reported a decreased work productivity due to CPP, with an estimated total indirect cost of \$ 555.3 million^[6]. The national representative charges in the U.S. for treatment of disease specific interstitial cystitis was \$ 194,379,567 in 2006. The disease specific estimated annual expenditure for privately insured individuals with and without interstitial cystitis, was respectively \$17,407 and \$ 9,429^[7]. The estimated cost of lost productivity due to IC/BPS in 1987 in the U.S. was \$ 362.1 million^[8].

Diagnostic techniques for the evaluation of CPPS

Diagnostic techniques aim at getting a maximum understanding of what the complaints are, how different systems are involved and how the QoL is impaired. The following techniques are clinically used, and we give a critical evaluation of their clinical value.

Questionnaires

One specific questionnaire assessing all aspects of CPPS is not available. The McGill Pain Questionnaire (MPQ-DLV) informs about the different aspects of pain and QoL^[9]. The Pain Disability Index of Pollard (PDI) investigates the impact of pain on HRQoL^[10]. The National Institutes of Health-Chronic Prostatitis Symptom Index (NIH-CPSI)^[11], Interstitial Cystitis Symptom and Problem Questionnaire (ICSI)^[12], Pelvic Pain and Urgency/Frequency questionnaire (PUF)^[13] evaluate LUTS, and the level of HRQoL. The NIH-CPSI, ICSI, and PUF inform about sexual aspects. These questionnaires are commonly used for these specific properties. Comparing the scores of the questionnaires

showed an overall bad agreement for pain and QoL, and a moderate till good agreement for bladder complaints^[14]. Literature presents no questionnaires able to differentiate subtypes of bladder pain syndrome (BPS) (e.g. type 3C and non-type 3C BPS)^[15, 16]. Also the terminology used in the publications is not uniform and can lead to wrong conclusions^[15].

Development of a specific questionnaire permitting a reliable description of symptoms and HRQoL is a needed. For daily practice it should be easy to use. For research a more extended version would be needed.

Physical assessment

A thorough clinical assessment based on a four steps protocol including an extensive physical examination of the pelvic region can help to determine indications for more specific treatment in a multidisciplinary approach. Osteopaths and physical therapists can help to assess the patient in a holistic way, to indicate musculoskeletal factors accompanying visceral problems and help determine therapeutic options^[4, 17]. Neurodynamic tests can be used to determine mechanosensitivity in the peripheral nerves of the lumbosacral plexus^[4].

Sensory function

The assessment of sensory function in chronic pain is important, as is determining hypoesthesia or hyperesthesia^[18]. The Neurometer® device has been used for the evaluation of different nerve fiber types (e.g. A β , A δ and C fibers)^[19]. The investigation of peripheral nerve involvement is part of the diagnostic process in chronic pelvic pain and in bladder dysfunction^[20]. It can help to evaluate an evolution in certain conditions accompanied with sensory dysfunction or dysesthesia^[21]. But for a proper interpretation normative data are necessary. A study assessing normative data for the median and pudendal nerve showed a large variability in absolute values within one single person, but no statistical difference with one week interval. This indicates a low intraclass correlation^[22]. Comparison between Neuval database II data and normative data of other studies showed a weak agreement for pudendal nerve CPTs. The median nerve CPTs showed a better agreement^[23].

Symptoms and HRQoL in patients with CPPS.

A study in 18 male and 17 female CPPS patients described LUTS, sexual consequences, and disability^[24].

Lower urinary tract symptoms

Pain

CPPS patients had pain for an average of 5 years (0.5-30 years) as determined with the MPQ-DLV^[24]. The pain was interpreted as mild (18%), moderate (45%), and severe (36%) (PUF-SS). This study showed a broad standard deviation for all measures, indicating pain variability (MPQ-DLV VAS). The NIH-CPSI Pain and Discomfort Score confirms that all CPPS patients have pain in the pelvic area. The pain developed gradually in most cases (MPQ-DLV). The pain was mostly perceived in the same area(s) but could be radiating to other area(s) (MPQ-DLV). Pain may remain at the same level or can occur in attacks. Genitourinary pain or discomfort has been confirmed in all patients (NIH-CPSI, PUF)^[24].

Urologic symptoms

The PUF-SS showed urinary symptoms in all patients. Sixty nine percent had sensation of incomplete emptying of the bladder (NIH-CPSI). Urinary frequency has been shown in different questionnaires as 86% (NIH-CPSI), 91% (ICSI), and 68 % (PUF-SS). Not all patients had frequency, urgency or nocturia. The degree of urgency was mild in 24%, moderate in 47%, and severe in 29% (PUF-SS). Urinary urgency has been confirmed with the ICSI (74%) and PUF-SS (66%). The ICSI (83%) and PUF-SS (66%) showed nocturia. Pain or burning sensation during urination have been shown by the NIH-CPSI (32%) and ICSI (54%) Not all patients had pain or burning of urologic origin^[24].

Sexual

Eighty three percent had sexual restrictions (PDI). Forty five percent had pain or discomfort related to sexual activity (NIH-CPSI). Seventy three percent had pain or symptoms related to intercourse (PUF-SS). Only 69% was currently sexually active (PUF-SA)^[24].

Quality of Life

Total scores showed an important impact on the level of QoL and daily life (MPQ-DLV QoL-I, PDI, NIH-CPSI QoLIS Total, and PUF-BS T). The pain bothered in 97% (PUF-BS) and 100 % patients (NIH-CPSI QoLIS T). The ICPI showed bother as a result of urinary frequency, nocturia, urinary urgency, burning, pain, discomfort, or pressure in the bladder. The PUF-BS showed that the nocturia, and urinary urgency are bothersome. Sixty eight percent avoided sexual intercourse because of the pain indicating the consequence for the sexual lifestyle (PUF-BS). Important activity restrictions as a result of the pain have been shown MPQ-DLV QoL. Important disability has been

shown (PDI)^[24].

Gender differences for symptoms and QoL

Comparing the symptom scores for each question shows no difference between men and women (Chi-square-test $p > .05$). More women had 'severe urgency' (53% versus 6%) (Fisher exact $p .003$), which should be considered as a coincidence. Women were less sexually active (PUF-SA 47% versus 89%) (Chi-squared test $p .021$). More women had dyspareunia or other symptoms related to intercourse explaining why they avoided sexual intercourse. Also a significant difference has been shown for the PDI-T (MW-U $p .005$)^[24].

Physical assessment

The importance of a thorough clinical assessment for CPPS is often underestimated. Therefore a 'four step plan' is suggested in order to find additional possibilities for treatment in a multidisciplinary context^[4]. An extensive physical assessment in patients with CPPS shows a variety of pain areas related to anatomical structures and can indicate specific treatments.

Pain of musculoskeletal origin was demonstrated in 88%^[3]. The musculoskeletal pain was not restricted to the pelvis, but could be present in all parts of the spinal column and lower limbs. Ten percent had abdominal wall pain, mostly situated in the hypogastric and suprapubic area or at the level of the Spighelian line^[3].

Intra corporeal assessment showed 94% palpatory pain in men, situated in the pudendal channel obturator foramen, sacrococcygeal joint, or sacrospinal/tuberous ligaments. Only 6% had prostate palpatory provoked pain. External physical assessment showed palpatory pain at the annular ring in 50%, at the epididymis in 31%, at the testis in 25%, and at the vas deferens in 12.5%. No men had penis pain or urethral pain in this study^[3]. In women, internal assessment showed pain in 90%. Of these, 90% had pain in the pudendal channel, 80% at the sacrospinal/tuberous ligaments, the obturator foramen, or at the coccyx. Seventy seven percent had inguinal pain, 44% uterine, bladder neck or urethral pain. Unexpected, no pain was found with external assessment at the level of the external sexual organs (e.g. clitoris, labiae or vulva) although 4 reported dyspareunia^[3]. The pelvic floor function, evaluated with strength, endurance and exhaustion, was not weak in general, although women scored 1 unit lower compared to men. Ten percent of women and 12.5% of men had palpatory pain in at least one part of the pelvic floor^[3].

In CPPS patients mechanosensitivity has been shown with

neurodynamic testing and palpation in almost all peripheral nerves of the lumbosacral plexus. Especially pudendal nerve neuropathies were important (85%), although almost all other peripheral nerves can be involved. Internal palpatory assessment (n = 22) showed unilateral or bilateral palpatory provoked pain in the Alcock's channel in 54%. Also, pain of neuropathic origin has been shown for the perineal, ilioinguinal, genitofemoral, iliohypogastric, medial cluneal and lateral cluneal nerves. Minor neuropathies of the saphenous, lateral cutaneous femoral, posterior cutaneous femoral, obturator, dorsal and inferior cluneal nerves, were not found in this study^[3]. Eighty five percent had mono- or bilateral pudendal pain combined with other nerves of the lumbosacral plexus. In 12% of the cases no neuropathy was shown^[3].

Following the same standard protocol for physical assessment, healthy volunteers (n = 28) declared that the 'assessment and neurodynamic tests did not provoke pain or discomfort'^[3].

The physical assessment may clarify the multiple anatomical areas involved. Spatial summation is important in chronic pain and can keep the dorsal horn sensitized. Central and peripheral sensitization is an important issue in CPPS. The extensive physical assessment emphasizes the importance of the musculoskeletal system and the need for neurodynamic assessment. Neurodynamic evaluation may show peripheral mechanosensitivity or a nerve injury, indicating peripheral neuropathy. The prevalence of minor neuropathies in CPPS may be underestimated, and needs further research. Physical assessment can give additional information about the condition.

The sensory function of the pudendal and median nerves in healthy volunteers

A pilot study (n = 6) assessing CPTs with sinusoidal currents in healthy volunteers showed, for each frequency, a good agreement at different times, although a wide variability of values has been shown for each volunteer assessed at a different sequence^[3].

A study (n = 41) (male: 21; female: 20) assessing CPTs in healthy volunteers showed that with lower frequencies the mean CPTs decreased. Female CPTs were lower for all measures compared to men^[22]. The intraclass correlation with one week interval was low within one volunteer, although no significant difference in average value was shown with one week interval for the whole group. The sensory function showed a large variation at different measurements in time. Further research determining normative CPT data are needed for research using sinusoidal

stimulation^[22]. The pudendal and median nerves showed deviating CPT values in healthy volunteers. The pudendal nerve measurements showed deviating values for 2 KHz in almost 50%^[23]. Normative data in our study showed mostly no agreement with the data from other studies in healthy volunteers or control groups^[23]. These findings should be taken into account when making conclusions from CPT values. Techniques permitting to obtain constant normative data are mandatory if CPT measurement can be used as reliable diagnostic technique in CPPS patients^[23].

Conclusion

The prevalence of CPPS is important and includes an enormous cost to society.

CPPS presents with a variety of symptoms attaining multiple systems. The result of treatment, will greatly depend on an accurate diagnosis. We emphasize the importance of a thorough clinical assessment for CPPS suggesting a 'four step plan' with special attention to the musculoskeletal system. The physical examination including palpation and neurodynamic assessment can be a help to indicate pain points and peripheral neuropathies.

There exists no universal treatment to be given to all CPPS patients. A large variety of symptoms and negative impact on QoL has been shown using questionnaires (e.g. MPQ-DLV, PDI, NIH-CPSI, ICSI, and PUF). Comparing the scores for symptoms and QoL using different questionnaires in patients with CPPS, showed varying results per symptom. Therefore, overall conclusions concerning pain intensity and QoL cannot be made based on the results from one questionnaire. The results of bladder symptoms correspond better. Comparing results within one questionnaire shows no differences in symptoms for gender. Women are less sexual active and a major impact on the QoL has been shown compared to men.

Our study assessing CPTs in healthy volunteers showed that with decreasing frequencies, the mean CPTs decreased. In women all CPTs measures were lower compared to men. A weak intraclass correlation has been shown comparing CPTs of healthy volunteers with one week interval, although no significant difference has been shown for the whole group in this study indicating variability in sensory function. Both, the pudendal and median nerves showed deviating values. Normative data in our study show almost no agreement with healthy volunteers or control groups in other studies, questioning the application for research. Although the Neurometer objectively measures sensory function, it remains a challenge to obtain normative data taking care of all aspects involved.

Conflict of interest

The authors declare that they have no competing interests.

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Abbreviations

BPS: bladder pain syndrome
CPPS: Chronic pelvic pain syndrome
CPT: Current Perception Threshold
HRQoL: Health Related Quality of Life
ICSI: Interstitial Cystitis Symptom Index (O'Leary Sant)
ICPI: Interstitial Cystitis Problem Index (O'Leary Sant)
LUTS: Lower Urinary Tract Symptoms
MPQ: McGill Pain Questionnaire
MPQ-DLV: McGill Pain Questionnaire Dutch Leiden/Leuven Version
NIH: National Institutes of Health
NIH-CPSI: NIH-Chronic Prostatitis Index
NIH-CPSI QoL: NIH-CPSI Quality of Life
NIH-CPSI QoLIS: NIH-CPSI Quality of Life Impact Score
PDI: Pain Disability Index (Pollard)
PUF: Pelvic Pain and Urinary/Frequency Symptom Scale
PUF-SS: PUF Symptom Score
PUF-BS: PUF Bother Score
PUF-SA: PUF Sexually Active
QoL: Quality of Life
QoL-I: Quality of Life Index
QoLIS: Quality of Life Impact Score
VAS: Visual Analogue Scale for pain (McGill)

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