

**NEUROLOGICAL ASPECTS OF PELVIC PAIN SYNDROMES IN WOMEN WITH
PELVIC ORGAN DISORDERS**

Aripova Maftuna Khurramovna, Muni Jimiben, Satyamsinh Chauhan, Umang

¹Department of Neurology and Folk medicine of Tashkent State Medical University

²Faculty of General medicine, 502-B Group of Tashkent State Medical University

***Corresponding author:** Maftunaripova@gmail.com

Abstract: In connection with the increase in life expectancy and the increase in the number of people who lead a sedentary lifestyle, the need arose to take measures to combat diseases of the musculoskeletal system. At the moment, the most common diseases of the musculoskeletal system are degenerative and inflammatory diseases of the joints, as well as osteoporosis. However, in addition to diseases of the musculoskeletal system, a large role should be given to somatic pathology accompanied by back pain. Pain syndromes in diseases of the pelvic organs in women is a complex problem requiring a multisystem approach in cooperation not only with gynecological specialists, but also with neurologists, urologists, surgeons, and other specialists. Long-term pain syndrome leads not only to physical discomfort, but also to moral discomfort and leads to loss of ability to work and problems in the family. The main localization of pain syndromes in diseases of the pelvic organs in women is the pelvic region and the back. Chronic pain in the pelvic region has a duration of more than half a year, has no connection with the period of menstruation, and can lead to loss of ability to work, and may also require surgical or medical intervention. According to the definition in ICD-10, dorsopathies are understood as a complex of lesions of the musculoskeletal system with the involvement of elements of connective tissue, accompanied by pain syndrome in a certain area of the back and functional disorders. The most life-threatening causes of back pain can be acute inflammatory diseases, complications of the course of pregnancy, and malignant neoplasms, both primary and secondary. Treatment of pain syndromes has its own difficulties since often there is an incorrect diagnosis of the underlying cause and, as a result, it is difficult to select a pathogenetically substantiated therapy. The article presents the clinical features of the course of the pain syndrome, diagnostic criteria, principles of management, diagnostic algorithm, as well as treatment tactics for patients with these issues.

Keywords: pain syndrome, inflammatory diseases, dorsopathy, pelvic organ diseases.

INTRODUCTION

Pain or pain syndrome, in accordance with the definition of the IASP (International Association for the Study of Pain) and the WHO, is an unpleasant and uncomfortable sensation arising as a result of direct or possible damage to body tissues and accompanied by emotional tension. Despite the fact that patients are three times more likely to try to handle this problem independently and do not resort to the help of specialist doctors, according to statistics, the presence of chronic back pain is the most frequent reason for visiting a doctor. Only in the case of frequent recurrences of pain, long-term or highly pronounced pain syndrome, do patients seek medical help.

Management of this category of patients represents an actual multidisciplinary problem; therefore, when searching for causes of back pain, one should rely on physical, instrumental, and laboratory data, and also take into account the characteristics of each patient separately. In accordance with the definition of the EAU (European Association of Urology, 2018), the diagnostic criteria for chronic pelvic pain are: localization in the pelvic and back region, duration of at least six months, ineffectiveness of therapy, inconsistency of pain intensity with the volume of the lesion, limitation of daily activities, and disturbances of the psycho-emotional background.

Not counting the main pain syndrome, patients with chronic pelvic pain encounter disorders of the gastrointestinal tract, urogenital, and sexual spheres. There are various data on the prevalence of this pathology in women; in world literature, this indicator varies from 4% to 24%. Quite often, chronic pain is the cause of diagnostic laparoscopies and an indication for removal of the uterus, and according to research, in the USA, annual expenditures on this pathology vary from 1 to 2 billion dollars. This pathology is met mainly in women of young age, while a characteristic feature is that these patients do not seek professional help for a long time, approximately 2–3 years after the appearance of the first signals.

MATERIALS AND METHODS

Anatomical and Physiological Features of the Pelvic Organ

The pelvic organs possess two systems of innervation:

- The **somatic** part is responsible for the sensitivity of the skin covers and mucous membranes, and is also responsible for the motor function of the striated musculature.
- The **vegetative** part innervates all internal organs and some deep structures.

Parasympathetic innervation is provided by the inferior hypogastric plexus, the nerves of which are responsible for the vagina (upper third), the uterus (cervix and lower segments), and the cervical ligaments.

Sympathetic innervation occurs with the help of afferent fibers in the urinary bladder, the broad ligament of the uterus, its fundus, as well as in the middle third of the fallopian tubes, while the lateral parts of the fallopian tubes and the ovaries give fibers into the superior mesenteric plexus, further directing into the lower thoracic segments (Th10–Th12) of the spinal cord.

Analysis of Cross-Organ Sensitization: The overlap in spinal segments (as shown in Table 1) explains the phenomenon of "cross-sensitization." For instance, chronic irritation of the cervix (S2-S4) often manifests as chronic sacral pain. This neurological link leads to diagnostic errors where patients are treated for "sciatica" or "disc herniation" while the underlying cause remains an untreated pelvic disorder.

Table 1. Segmental Innervation and Referred Pain Patterns in Women

Organ	Primary Innervation (Segments)	Common Referred Pain Zones (Head's Zones)
Uterine Body	Sympathetic (Th10 – L1)	Lower abdomen, upper lumbar

(Fundus)		region (L1-L2)
Cervix Uteri	Parasympathetic (S2 – S4)	Sacral region, deep pelvic pain, posterior thighs
Ovaries	Sympathetic (Th10 – Th11)	Umbilical region, T10 dermatome, groin area
Fallopian Tubes	Sympathetic (Th10 – L1)	Lower abdominal wall, iliac fossa
Urinary Bladder	Sympathetic (Th11 – L2), Parasympathetic (S2 – S4)	Suprapubic area, sacrum, perineum

This study is designed as a comprehensive narrative review, serving as the foundational phase for a subsequent prospective clinical study. The methodology involved a systematic search of peer-reviewed literature indexed in PubMed, Scopus, and Web of Science from 2010 to 2024.

Inclusion criteria focused on:

- Clinical trials and meta-analyses involving women aged 18–50.
- Studies documenting chronic pelvic pain (CPP) lasting more than six months.
- Research highlighting the intersection of gynecological pathology and neurological manifestations (dorsopathy).

To assess pain intensity and its impact on life quality, the study analyzed the efficacy of the Visual Analog Scale (VAS), the Oswestry Disability Index (ODI) for back pain, and the Hospital Anxiety and Depression Scale (HADS).

RESULTS

Features of pain syndrome pathogenesis

Individual parts of the pelvic organs receive sensory information from the same spinal cord segments as afferentation from the abdominal organs. This results in "cross-innervation". Neurons located in the dorsal root ganglia of the spinal cord form synapses with other neurons, including those of peripheral fibers transmitting pain sensitivity. This structure causes the irradiation of pain sensations during visceral pain syndromes, leading to difficulties in identifying the exact source of pain.

Based on the 2019 IASP classification, there are two variants of pain syndrome development:

-Primary : (including chronic pain syndrome) where the pain is chronic and the etiological factor is difficult to determine.

-Secondary : defined as visceral pain resulting from mechanical, vascular, and inflammatory changes.

The formation of chronic pain syndrome is rooted in an imbalance between the nociceptive and antinociceptive systems, which can arise from long-term neglect of pain or incorrect therapy for the underlying pathology. This leads to a decreased pain threshold and activation of the nociceptive system, represented by free peripheral endings of type A (myelinated) and type C (unmyelinated) sensory nerve fibers. Activation of this system leads to an increase in receptors associated with type C fibers, responsible for transmitting chronic pain impulses, resulting in peripheral sensitization.

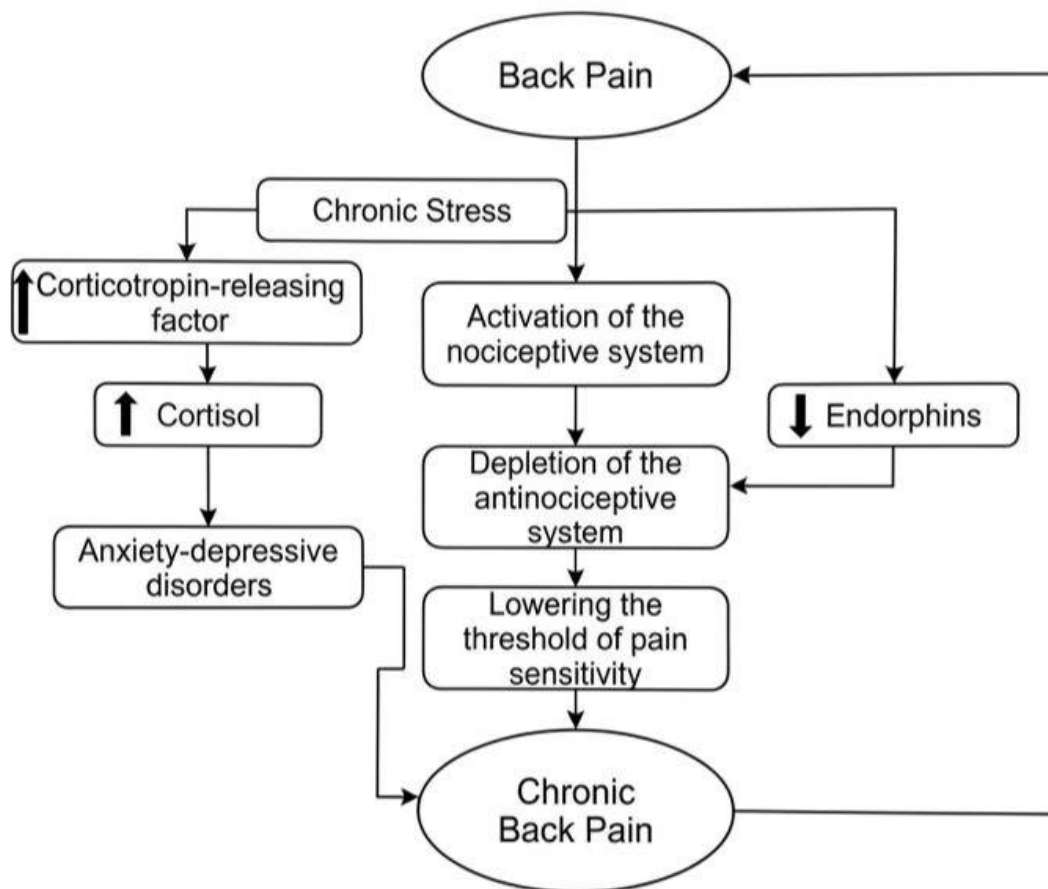


Figure 1 Mechanism of chronization of pain syndrome

The neuropathic component of chronic pain is based on the disruption of the electrical excitability threshold of the nociceptive system, activation of "sleeping" nociceptors, pathological impulses from demyelinated areas, and the reduction of inhibitory mechanisms. Additionally, long-term pain may involve a muscular component, leading to various myofascial syndromes and creating a vicious cycle. Myofascial syndromes can occur at any stage of the disease; even with successful therapy of the primary condition, pain may persist or intensify due to the involvement of pelvic musculature and peripheral nerves.

Clinical features of pain syndrome

Pelvic diseases accompanied by chronic back pain can be divided into uterine and extrauterine:

-Uterine: Atypical uterine bleeding, endometrial and cervical polyps, endometritis, leiomyoma, adenomyosis, etc.

-Extrauterine: Ectopic pregnancy, salpingitis and salpingo-oophoritis, ovarian cysts, etc.

Among these, endometriosis is the most common, affecting nearly 200 million fertile women worldwide : laparoscopically confirmed endometriosis is found in 25% of women with chronic back pain. In endometriosis, there is a hyperproduction of nerve growth factors due to pathological sprouting, where neuronal processes branch atypically, creating the basis for pathological activity. Biopsy studies show an increased number of sensory type A and C fibers, as well as cholinergic and adrenergic fibers, leading to increased production of neurotransmitters like calcitonin gene-related peptide and substance P. Mechanical damage by deep-growing endometrium also leads to ischemia, demyelination, and the development of neuromas acting as ectopic neuronal pacemakers.

Inflammatory diseases of the pelvic organs are another frequent cause, particularly when therapy is delayed or inadequate, leading to chronicity and the formation of adhesions. Prolonged pathological afferent impulses from inflammation sites to sensory centers in the brainstem, subcortical, and cortical regions disrupt functional balance and influence peripheral interoceptive stimuli.

Diagnosis

The diagnostic standard for women with pain syndromes should include clinical-neurological and instrumental examinations (Ultrasound, X-ray, MRI) and, if necessary, diagnostic laparoscopy. Beyond a detailed history, clinicians should use scales (e.g., the 10-point Visual Analog Scale) and questionnaires to obtain objective information on pain character and patient reactions. It is necessary to identify issues with digestive, urogenital, or sexual function and their relationship to the pain.

Typically, pain in gynecological diseases manifests as moderate chronic lumbalgia in the sacral region. Identifying the exact localization is vital; specific pain maps should be used as chronic pain often localizes in certain dermatomes.

For example:

Cervix/Lower Uterus: Pain radiates along the uterosacral ligaments to the lower back, buttocks, and posterior lower limb.

Middle Fallopian Tubes: Pain spreads to the lower abdominal wall.

Ovaries: Pain radiates to the anterior abdominal wall and umbilical region.

Somatogenic chronic pain is further characterized by the lack of influence of spinal movement on pain intensity, worsening pain when standing for long periods, and the presence of hyper-sensitive zones (Zakharyin-Ged zones also known as Head zones or Head's area).

Therapy requires identifying the cause and mechanisms of the syndrome followed by a pathogenetically substantiated complex approach.

Pharmacology:

To conduct adequate therapeutic measures for chronic pain, first of all, it is necessary to identify the cause and mechanisms of the syndrome's occurrence, and further use a pathogenetically substantiated complex approach to therapy. First of all, with the goal of relief of the pain syndrome, it is necessary to choose an analgesic with the correct point of action. If the process affects smooth muscles, it is necessary to use preparations with a spasmolytic effect; with a myofascial or joint character of pain, the most preferred preparations of choice are glucocorticoids, because they have a wide spectrum of action (anti-inflammatory and anti-edematous), and also in some cases are used locally.

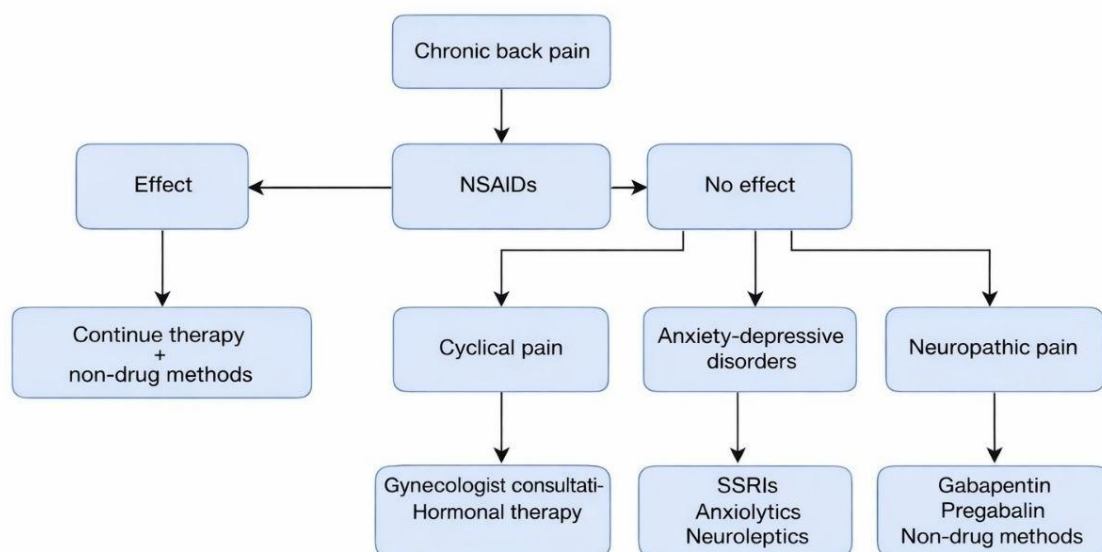


Figure 2 Principles of Chronic Back Pain Therapy

As a treatment for the main disease, oral contraceptives are used, however, despite the fact that various groups of these preparations have equivalent efficiency, with long-term therapy, it is necessary to take into account their side effects. The surgical approach in the treatment of chronic pain syndrome has efficiency from 50% to 80% and implies the application of endocoagulation of the sacral-uterine ligaments, resection of the superior hypogastric plexus, and other methods, up to radical operations.

As additional methods, physiotherapy, manual therapy, as well as various methods of TPT (therapeutic physical training) are used, especially when the myofascial component is involved. Also, an integral component in the therapy of chronic pain syndrome is methods of psychological support. As is known, in patients with chronic pain syndrome, behavioral changes quite often arise and the quality of life is disturbed, so the use of traditional methods of treatment in combination with methods of cognitive-behavioral psychotherapy helps to increase the efficiency of the conducted therapy.

CONCLUSION

Overall, our data provide chronic pain in various diseases of the pelvic organs is not only a problem for gynecologists, but also for neurologists, and therefore a joint multidisciplinary approach significantly increases the chances for accurate diagnosis and allows for more correct medical measures. These findings could serve as the basis for further studies aimed at identifying the mechanisms response for the adaptive response of the dorsopathy with oncological pathology of uterus. It is also necessary to note the importance of complex therapy for the pain syndrome using the entire arsenal of therapeutic, surgical, physiotherapeutic, and psychological methods.

REFERENCES

1. Anaf V, Chapron C, El Nakadi I et al. Pain, mast cells, and nerves in peritoneal, ovarian, and deep infiltrating endometriosis. *Fertil Steril* 2006; 86 (5): 1336–43.
2. Anaf V, Simon P, El Nakadi I et al. Hyperalgesia, nerve infiltration and nerve growth factor expression in deep adenomyotic nodules, peritoneal and ovarian endometriosis. *Hum Reprod* 2002; 17 (7): 1895–900.
3. Aziz Q, Giamberardino MA, Barke A, et al. The IASP classification of chronic pain for ICD-11: chronic secondary visceral pain. *Pain*. 2019 Jan;160(1):69-76. doi: 10.1097/j.pain.0000000000001362.
4. Benyamin R.M. et al. // *Pain Physician*. 2012. V. 15. № 4. P. E363.
5. Berkley KJ, Dmitrieva N, Curtis KS, Papka RE. Innervation of ectopic endometrium in a rat model of endometriosis. *Proc Natl Acad Sci USA* 2004; 101 (30): 11094–8. Epub 2004.
6. Berkley KJ, Rapkin AJ, Papka R.E. The pains of endometriosis. *Science* 2005; 308 (5728): 1587–9.
7. Carey TS, Garrett JM, Jackman A, Hadler N. Recurrence and care seeking after acute back pain: results of a long-term follow-up study. *North Carolina Back Pain Project. Medical Care*. 1999;37(2):157-164. <https://doi.org/10.1097/00005650-199902000-00006>
8. Cummins TR, Rush AM. Voltage-gated sodium channel blockers for the treatment of neuropathic pain. *Expert Rev Neurother* 2007; 7 (11): 1597–612.
9. Daniels J.P., Khan K.S. // *BMJ*. 2010. V. 341. P. c4834.
10. EAU guidelines on chronic pelvic pain 2012.
11. Engeler D, Baranowski AP, Borovicka J, et al. EAU guidelines on chronic pelvic pain. *EAU Guidelines*. EAU Annual Congress. Copenhagen; 2018. 84 p
12. Fall M, Baranowski AP, Fowler CJ et al. European Association of Urology. EAU guidelines on chronic pelvic pain. *Eur Urol* 2004; 46 (6): 681–9.
13. Gunter J. Chronic pelvic pain: an integrated approach to diagnosis and treatment. *Obstet Gynecol Surv* 2003; 58 (9): 615–23.
14. Hahn L. Chronic pelvic pain in women. A condition difficult to diagnose – more than 70 different diagnoses can be considered. *Lakartidningen* 2001; 98 (15): 1780–5.,
15. IASP. International Association for the study of pain «Pain terms» glossary. *Pain* 1986; 44–8 (Suppl. 3): 175–9.
16. Jarrell J.F. et al. // *Obstet. Gynaecol. Can.* 2005. V. 27. № 8. P. 781
17. Latthe P. et al. // *BMJ*. 2006. V. 332. № 7544. P. 749
18. Lippman S.A. et al. Uterine fibroids and gynecologic pain symptoms in a population-based study // *Fertil Steril*. 2003; 80: 1488. [PMID: 14667888].
19. Lipscomb GH, Ling FW. Chronic pelvic pain. *Med Clin North Am* 1995; 79 (6): 1411–25.
20. Lund I, Lundeborg T. Aspects of pain, its assessment and evaluation from an acupuncture perspective. *Acupunct Med* 2006; 24 (3): 109–17.

21. Manchikanti L. et al. // Pain Physician. 2012. V. 15. № 3. P. E199.
22. Million M, Wang L, Adelson DW et al. Pregabalin decreases visceral pain and prevents spinal neuronal activation in rats. Gut 2007; 56 (10): 1482–4.
23. Misra SC, Pandey RM. Efficacy of drotaverine in irritable bowel syndrome: a double-blind, randomized, placebo-controlled clinical trial. Am J Gastroenterol 2000; 95: 2544 (Abs 455)
24. Moalem G, Tracey DJ. Immune and inflammatory mechanisms in neuropathic pain. Brain Res Rev 2006; 51 (2): 240–64. Epub 2006.
25. Nicholas M, Vlaeyen JWS, Rief W et al. The IASP classification of chronic pain for ICD-11: chronic primary pain. Pain. 2019 Jan;160(1):28-37. doi: 10.1097/j.pain.0000000000001390.
26. Royal College of Obstetricians and Gynaecologists. The Initial Management of Chronic Pelvic Pain 2005; Guideline 41.
27. Scholz J, Woolf CJ. The neuropathic pain triad: neurons, immune cells and glia. Nat Neurosci 2007; 10 (11): 1361–8.
28. Vleeming A. et al. // Eur. Spine J. 2008. V. 17. № 6. P. 794. /// Ortiz D. // Am. Fam. Physician. 2008. V. 77. № 11. P. 1535.
29. Wesselmann U. Clinical characteristics and pathophysiology of pelvic pain in women. Schmerz 2002; 16 (6): 467–75.
30. Wolsko PM, Eisenberg DM, Davis RB, Kessler R, Phillips RS. Patterns and perceptions of care for treatment of back and neck pain: results of a national survey. Spine (Phila Pa 1976). 2003;28(3):292-298. <https://doi.org/10.1097/01.BRS.0000042225.88095.7C>
31. Zondervan K.T. et al. // Br. J. Obstet. Gynaecol. 1999. V. 106. P. 1149.
32. Батышева Т.Т., Шварц Г.Я. Диагностика и лечение болей в спине у женщин в постменопаузальном периоде. // Лечащий врач. – 2002. - № 12.
33. Данилов А.Б. Нейропатическая боль. М.: Нейромедиа, 2003.
34. Решетняк В.К., Кукушкин М.Л. Боль: физиологические и патофизиологические аспекты. В кн.: Б.Б.Мороз (ред.). Актуальные проблемы патофизиологии (избранные лекции). М.: Медицина, 2001.