

Abstract

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**COMPREHENSIVE TREATMENT OF DISCOPATHIES OF
THE LUMBAR SPINE**

Introduction. Degenerative disc disease is one of the most common diseases of the musculoskeletal system, characterized by dystrophic changes in the intervertebral disc and vertebral bodies adjacent to it. The main symptoms of this disease are pain and sensory and motor disorders, which, according to various authors, occur in 50–80% of adults.

The main objective of the study was to find and implement the optimal set of treatment measures for degenerative disc disease depending on the age of a patient.

Materials and Methods. The medical records of inpatients who were treated in the Neurosurgical Department of the Sumy Regional Clinical Hospital in 2019–2020 were analyzed. The course of treatment of 93 patients (61 men and 32 women) was studied. The patients were divided into groups according to their age: young age (under 25) – 13 men and 8 women; middle age (under 60) – 24 men and 19 women; and elderly age (over 60 years) – 18 men and 11 women.

The combined use of pathogenetically justified physiotherapeutic measures in the treatment complex is gaining more and more interest. Their distinctive features are physiologic nature, absence of allergic manifestations, the ability to influence most of the pathogenesis of the disease, and the organic combination with other therapeutic factors. Unfortunately, there is an increase in the incidence of temporary incapacitation and progressive course, which often leads to disability and significant financial costs associated with expensive modern methods of diagnosis, treatment, and further provision of employment to patients.

The results of our study show that complex treatment including pathogenetic drug therapy, complex paravertebral block, therapeutic physical exercise, and physiotherapy treatment methods provides adequate recovery of spinal function regardless of dystrophic and degenerative changes severity and patient's age.

Treatment of degenerative disc disease should be comprehensive and directed at the various symptoms and links of the pathological process.

Keywords: discopathy, degenerative disc disease, intervertebral disc, lumbar spine, pain syndrome.

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Резюме

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КОМПЛЕКСНЕ ЛІКУВАННЯ ДИСКОПАТІЙ ПОПЕРЕКОВОГО ВІДДІЛУ ХРЕБТА

Актуальність. Остеохондроз хребта є одним з найбільш поширених захворювань опорно-рухової системи, характеризується дистрофічними змінами в міжхребцевому диску і тілах хребців, що прилягають до нього. Основними симптомами цього захворювання є біль, чутливі та рухові порушення, які, за даними різних авторів, зустрічаються у 50–80 % дорослого населення.

Основною метою і завданням дослідження був пошук із подальшим впровадженням у практику оптимального комплексу лікувальних заходів при остеохондрозі залежно від віку хворого.

Матеріали та методи. Було проведено аналіз медичних карт стаціонарних хворих, що знаходились на лікуванні в нейрохірургічному відділенні КНП СОР «Сумська обласна клінічна лікарня» в 2019–2020 роках. Проаналізовано перебіг лікування 93 пацієнтів (61 чоловік та 32 жінки). Розподіл на групи проводили за віком: молодого віку (до 25 років) – 13 чоловіків та 8 жінок, середнього (до 60) – 24 чоловіка та 19 жінок, та старшого віку (старші 60 років) – 18 чоловіків та 11 жінок.

Все більшого визнання отримує комбіноване використання патогенетично обґрунтованих фізіотерапевтичних факторів у лікувальному комплексі. Відмінною особливістю їх є фізіологічність, відсутність алергічних проявів, можливість впливати на більшість ланок патогенезу захворювання та органічне поєднання з іншими лікувальними факторами. На жаль, спостерігається зростання захворюваності з тимчасовою втратою працездатності та тенденцією до прогресивного перебігу, що часто призводить до інвалідності, суттєвих матеріальних витрат, що пов'язано з дороговартісними сучасними методами діагностики, лікування та подальшим працевлаштуванням хворих.

Результати нашого дослідження свідчать, що комплексне лікування із застосуванням патогенетичної медикаментозної терапії, комплексних паравертебральних блокад, лікувальної фізичної культури, фізіотерапевтичних методів лікування, забезпечує адекватне відновлення функції хребта незалежно від вираженості дистрофічно-дегенеративних змін і віку хворого.

Лікування остеохондрозу хребта має бути комплексним, спрямованим на різні симптоми та ланки патологічного процесу.

Ключові слова: дископатія, остеохондроз, міжхребцевий диск, поперековий відділ хребта, больовий синдром.

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Introduction/Вступ

Discopathy is a medical condition of the spine caused by degenerative and dystrophic changes involving the musculoskeletal system and leading

to its further dysfunction. The disease is manifested by deformation, height reduction and dehydration of intervertebral discs. Deformation of the discs leads to loss of elasticity with further development of complicated degenerative disc disease. Today,

degenerative disc disease is widespread – about 80% of the population present with this problem. Discopathies can also occur in children. The peculiarity of pediatric degenerative disc disease is the slowing down of growth and deformation of the developing skeletal bones [1].

Restriction of mobility is the main symptom that helps to recognize a discopathy. The patient experiences dull or sharp pain, which leads to stiffness and reduces vital activity. The most common causes are increased load on the spine, injuries, and hereditary predisposition [3].

Today, prevention and timely treatment of degenerative disc disease is the goal to achieve for everyone who wants to maintain his health and performance.

The incidence of degenerative disc disease in adults is associated with continuous, heavy load on the spine or prolonged sitting, for example, when working on a computer or driving a car. On average, the incidence of degenerative disc disease is equally common in both men and women of up to 50 years of age. However, the first signs appear earlier – at about 25–35 years [2].

Degenerative disc disease of the lumbar spine is the most common type of the disease. The reason is that this part of the spine is exposed to the heaviest load, especially when bending the trunk or lifting heavy objects. However, in the sitting position, the intervertebral discs are also affected. With frequent and prolonged sitting, the back muscles gradually become hypotrophied, losing their strength and elasticity, while the load remains significant [1].

With degenerative disc disease of the lumbar spine, the patient experiences back pain. The pain can be aching or lumbago-like. Pathological sensations appear in the lower back, but can irradiate to the buttocks and legs. In addition to pain, lumbar degenerative disc disease may be characterized by numbness of the lower extremities and functional disorders of pelvic organs.

Scientists consider degenerative disc disease as a normal natural phenomenon due to degeneration of the human body. Apart from that, the development of the disease triggers a cascade of reactions caused by a lack of vitamins and trace elements necessary for bone regeneration. A key role is played by deficiencies of trace elements such as calcium and zinc.

Frequent catarrhal diseases also contribute to disease activation. Climate factors have been associated with the increased risk of degenerative

disc disease in people living in high humidity areas [5].

Heavy object lifting, injuries, and other factors of mechanical load on the spine damage intervertebral discs, and their cartilage tissue loses stability and elasticity. Injury at a young age can play a key role after many years. When the backbone is healthy, intervertebral disks provide elasticity and flexibility. However, over time, the discs gradually lose these properties and begin to change position. This causes pain and other symptoms of degenerative disc disease. However, the diagnosis of any type of degenerative disc disease is complicated by multifactorial symptoms which depend on age, exercise, posture, obesity, lifestyle, etc. [3].

Due to the multifactorial nature of degenerative disc disease development, the immediate cause is not always easily determined, and the diagnosis is difficult. Symptoms of the disease are unclear and the etiology is not fully understood [5].

The treatment of degenerative disc disease directly depends on its stage: an early stage of the disease usually requires massage and physiotherapy, but if the course is more severe, all these measures will only serve a preventive effect, since in this case, more radical treatment is needed. Treatment of discopathies falls into two categories: surgery and conservative therapy. The main indications for surgical treatment are long-term acute pain caused by intervertebral disc protrusion, spinal instability and/or stenosis of the spinal cord, ineffectiveness of conservative therapy. There are two techniques to perform the operation: microsurgical and classical. The first technique is a more state-of-the-art method. The operation is performed via a small incision, through which a special tool is introduced, with bone structures left intact. After such an operation, the rehabilitation period is accelerated. The classic technique of surgery involves a larger incision, and thus, a more serious trauma, with partial removal of bone structures. In this case, the patient needs long-term postoperative rehabilitation [6].

Conservative treatment strategies include all therapeutic procedures used in the early stage of degenerative disc disease: massage, therapeutic exercise (a set of special exercises selected individually by a qualified specialist), physiotherapy (electrophoresis, magnetic therapy, ultrasound, etc.), acupuncture therapy [7].

Physiotherapy methods are included in national clinical guidelines and standards of care for

degenerative disc disease. To treat lumbar degenerative disc disease, the following are used: electromyostimulation, amplipulse therapy, shock wave therapy, intratissual electric stimulation, laser therapy. Magnetic therapy remains a commonly used method in complex treatment. Its advantages include good tolerability and few contraindications, as well as its suitability for the period of exacerbation. By affecting all parts of the pathological process, it significantly reduces pain after a few procedures and allows expanding motor activity volume. In addition, improving the trophism in the affected tissues slows down the progression of the disease [6].

Therapeutic exercise is an integral part of the comprehensive treatment of degenerative disc disease. Exercises aimed at maintaining the tone of the spine skeletal muscles and relieving pathological muscle spasms, help to restore and maintain motor activity and reduce pain severity. A significant advantage of exercise therapy is that after a few sessions with a trainer, a patient can perform exercises at home every day. The most effective method of exercise therapy is mechanotherapy that is training with simulators according to an individually developed plan with no axial load, as core muscles formation requires weight training [7].

Immobilization devices are widely used. These are spinal supports of various designs to protect the spine against sudden, possibly injuring movements and redistribute the load during static work. It is advisable to use them only during the action of adverse factors (driving, sedentary work, etc.) since long-term use contributes to the development of muscle hypotrophy and exacerbation of the disease [6].

Drug therapy: analgesics, anti-inflammatory, and anti-edematous drugs, drugs to improve blood flow, muscle relaxants, Pregabalin, Gabapentin. Nonsteroidal anti-inflammatory drugs are most often used in the treatment of this pathology. They are available in various formulations for both topical (gel, ointment) and systemic use (tablets, rectal suppositories, solutions for intramuscular and intravenous administration). Their action is based on blocking the inflammatory process at the enzymatic level, which eliminates edema in the affected area and significantly reduces pain. In the early stage of the disease, local use of nonsteroidal anti-inflammatory drugs (NSAIDs) in combination with non-drug methods (therapeutic exercise, magnetic therapy) may be sufficient. In case of the expressed pathological process and severe pain syndrome, it is

necessary to use tablets or even injectable drugs. However, despite the anti-inflammatory and analgesic effect of NSAIDs, long-term systemic use may cause or exacerbate ulcerative-erosive processes of the gastrointestinal tract, as well as renal and hepatic disorders. Therefore, patients who take NSAIDs for a long time also need drugs for gastric mucosa protection [4].

In case of insufficient effectiveness of nonsteroidal anti-inflammatory drugs, it is advisable to use them in a combination with analgesics and drugs for vegetative system correction first before trying dose titration. Among the whole range of modern anticonvulsants, Pregabalin and Gabapentin are most often used to eliminate neuropathic pain. Their action is associated with decreased sensitization, restoration of neurotransmitter balance, increased gamma-aminobutyric acid-ergic effects, and reduced effects of glutamate [7].

Systemic muscle relaxants, which relieve muscle spasms, are also widely used. They act to relax spasmodic muscles, reduce the compression of nerves and blood vessels and lessen edema in the affected area; this improves blood circulation and innervation and, thus, relieves pain. Reduced muscular defense allows the tension of the ligaments to decrease; the pain subsides, while the volume of movements increases. Muscle relaxants for the treatment of degenerative disc disease are available in the form of tablets and solutions for intramuscular administration; to achieve a therapeutic effect, they are taken for a long time with a gradual dose increase [8].

B vitamins are used both as tablets and solutions for intramuscular administration. They are believed to have a neurotrophic and mild analgesic effect, but there is no reliable evidence-based justification for their use in degenerative disc disease [6].

Another effective technique is the correction of pain with drug nerve blocks. This is an injection given to the affected area to "switch off" the pain reflex, relieve inflammation, lessen swelling around the nerve root, and improve its trophism. The therapeutic block is necessary to break the vicious circle: pain impulse – muscle spasm – pain. The drug is injected at a certain point – in the segment of the spine, where the pain is most severe. The drug "envelops" the affected nerve trunks and blocks pain receptors, which helps to achieve a therapeutic effect: analgesia and elimination of edema and inflammation. With the drug block, the pain regresses in 3 stages: first, the intensity of pain

increases due to irritation of nerve receptors with a needle, then the pain is gradually mitigated; in the third stage, the pain disappears. As compared to other therapeutic methods, the advantages of therapeutic blocks are: rapid relief; the drug acts directly at the site of pain and provides a quality analgesic effect; the active substance is administered directly at the pain point that minimizes the risk of side effects. In addition to the direct analgesic effect, drug nerve block relieves muscle spasm and vessel wall spasm, provides an excellent therapeutic effect for a long time, eliminating both pain and its causes, and improves trophism of affected tissues. The procedure can be performed repeatedly, at the time of disease exacerbation accompanied by pain [9].

There is a basic classification of spinal nerve blocks: receptor block, tissue block, ganglion block, conduction block, paravertebral block. A paravertebral block is one of the most commonly used procedures to relieve pain in degenerative disc disease. A paravertebral block is a collective concept. This term suggests that the doctor injects an analgesic in close proximity to the affected segment of the spine. This procedure can be performed in different ways: intradermally, subcutaneously, intramuscularly, near the nerve root or in the perineural area. Sometimes the paravertebral injection is performed to block the ganglia of the sympathetic trunk if the pain is caused by the protrusion of the intervertebral disc [8].

Epidural block of the lumbar part is a block of spinal nerve roots, for which the anesthetic is injected into the epidural space – the space in the spinal canal between the vertebral canal and the spinal cord. The anesthetic drug is administered at the border of the sacral and lumbar spine. Once in this area, the solution spreads to several segments above and below. The anesthetic administered epidurally blocks nerve receptors in vertebral segments affected with degenerative disc disease. It relieves pain, as well as eliminates the inflammatory process, which is a common cause of pain in degenerative disc disease. Patients hardly feel the drug injection moment, with the exception of patients having intervertebral discs protrusions or hernias. They experience a significant increase in pain during administration, but after the procedure, the pain disappears after 2–3 minutes [5].

An intra-articular block is also used in lumbar degenerative disc disease. The drug is injected into the joint capsule of the facet joint in the lumbar

region. This technique is actively used to treat acute and chronic back pain. The course consists of 3–4 procedures with an interval of 5–7 days. In many patients, the therapeutic effect occurs in 10 minutes after the procedure. Within half an hour, less severe pain returns, and then gradually passes away. Two types of drugs are most often used for nerve block therapy: local anesthetics and glucocorticosteroids. As a preventive measure, the patient is recommended to remain in the prone position for several hours after the procedure. In the coming few days, physical exertion and active motor activity must be excluded. Improper behavior and non-compliance with the appropriate regime will cancel the entire effect of previous treatment of degenerative disc disease [10].

The main objective of the study was to find and implement the optimal set of treatment measures for degenerative disc disease depending on the age of a patient.

Materials and Methods. The medical records of inpatients who were treated in the neurosurgical department of the Sumy Regional Clinical Hospital in 2019–2020 were analyzed. The course of treatment of 93 patients (61 [65.6%] men and 32 [34.4%] women) was studied. The patients were divided into groups according to their age: young age (under 25) – 13 men and 8 women (22.6%); middle age (26–60) – 24 men and 19 women (46.2%); and elderly age (over 60 years) – 18 men and 11 women (31.2%).

Results. In our study, it was found that younger patients responded well to conservative treatment and especially to traction therapy, and their rehabilitation period after the surgery passed faster. In the group of middle-aged and elderly patients, an MRI study revealed moderate spondylosis and spondyloarthritis in 33 people (35.5%), which were a manifestation of dystrophic-degenerative changes in the lumbar spine. In the group of young patients, 5 (5.4%) patients (3 men and 2 women) required surgical treatment, i.e. sparing microdiscectomy; 9 (9.7%) patients in the middle-age group had classical surgery (6 men and 3 women); 6 (6.5%) patients in the elderly group were operated without sparing microdiscectomy, which was associated with severe degenerative-dystrophic changes in the lumbar spine (4 men and 2 women).

Patients who did not require surgical treatment responded well to conservative therapy, paravertebral blocks, physiotherapy, and traction therapy, followed by adaptation and therapeutic exercise to strengthen the muscular skeleton. It

should be noted that therapeutic exercise was performed in the period after severe pain had been relieved.

In the group of young patients, paravertebral blocks were effective after 2–3 procedures in 76.2% of patients; in the middle-aged group, a full course (5 procedures) was performed in 69.8% of patients to relieve pain; and only 34.5% of patients in the elderly group responded well to the course of paravertebral (17.25%) and intra-articular (17.25%) blocks without requiring further intensive treatment at a specialized department.

Epidural blocks were performed, and were effective, in 2 patients of the middle-age group and one patient in the elderly group, but did not have statistical significance for the assessment of overall treatment outcomes, and were associated with other factors and features of the disease in these patients.

Conclusions/Висновки

The results of our study show that complex treatment including pathogenetic drug therapy, complex paravertebral block, therapeutic physical exercise, and physiotherapy treatment methods provides adequate recovery of spinal function

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In the elderly group, a neuropathic type of pain was observed more often (in 86.2% of patients) and required long-term pathogenetic treatment with prolonged rehabilitation of up to 2–3 months.

Non-drug, non-invasive, and non-surgical treatment strategies, especially therapeutic exercise and physiotherapy, were effective in 71.4% of patients of Group I, 65.1% – in Group II, and 41.4% – in the elderly group.

Discussion. The results of our study were consistent with the results of Shao-qing Chen and Luciana G. Macedo, who assessed the age-related aspects of lumbar degenerative disc disease, and with the findings of Margaux Boisson and Kamal Constantin Kamal; however, they differed from the data of David Oehme, Karin D. van den Eerenbeemt and Masoud Hashemi in the data related to the methods of conservative and surgical treatment of discopathies.

regardless of dystrophic and degenerative changes severity and patient's age.

Treatment of degenerative disc disease should be comprehensive and directed at the various symptoms and links of the pathological process.

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Conflict of interest/Конфлікт інтересів

The authors declare no conflict of interest.

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