Issues in the Study of Osteochondrosis

Saidumarova Marguba Tulanovna

Assistant, Department of Pathological Physiology, Fergana Medical Institute of Public Health, Fergana, Uzbekistan

ABSTRACT

The article under discussion depicts issues in the study of osteochondrosis. The author of the article considers that the causes of changes in the intervertebral discs are not fully understood. Treatment of osteochondrosis and its complications is carried out using conservative methods aimed at eliminating pain syndrome, spinal root dysfunction and prevention of progression of dystrophic changes in the structures of the spine. If prevention and treatment of osteochondrosis are not carried out, the disease will progress, gradually affecting the entire spine, which may eventually lead to a herniated disc, pinched nerve endings and spinal cord areas. In severe cases, the consequences of osteochondrosis can only be eliminated by surgery with a long recovery and rehabilitation period.

Keywords: osteochondrosis, spondyloarthrosis, disease, dystrophic disorders, cervical, thoracic, lumbar, dynamic nature, back pain, risk factors.

Introduction

Osteochondrosis (from the Greek όστέον - bone and χόνδρος - cartilage) is a complex of dystrophic disorders in the articular cartilage. It can develop in almost any joint, but intervertebral discs are most often affected. Depending on the location there are cervical, thoracic and lumbar osteochondrosis.

It should be noted that none of the developed countries of the world, nor any medical classification of degenerative-dystrophic diseases has a nosological unit "osteochondrosis of the spine". Only in the former German classification "osteochondrosis" previously referred to the classic "Schmorl's hernia". Webster's American English Dictionary does not even mention spinal osteochondrosis, nor do medical English dictionaries. The theory of spinal osteochondrosis is the most correct from the position of the modern view of pathology. There is no contradiction in the fact that the overwhelming proportion of back pain under stress and overload of a static and dynamic nature arises as a consequence of dystrophic changes in the spine of which osteochondrosis and spondyloarthrosis are the most common. At the same time, the formation of clinical syndromes can be of different nature: parallel or multistage development with superimposition and intertwining of pathogenetic and sanogenetic reactions of the body. However, to date, there is no complete unity among representatives of different medical specialties and representatives of different health care systems. This is due to the historically established terminology to denote this process, different for neuropathologists and orthopedists, representatives of Western medicine.

Main part

The clinical manifestations of spinal osteochondrosis are manifold: from severe back pain with an acute herniation of a dystrophically altered disc to a feeling of discomfort in the back. The most common triggers of back pain are muscle strain, lifting

heavy weights, awkward movements, prolonged awkward posture, hypothermia, straining, etc. Risk factors for the development of spinal osteochondrosis include postural and motor imbalances (incorrect posture, decreased muscle extensibility, strength and endurance, pathological motor stereotypes), spinal dysplasia, constitutional hypermobility, dystrophic changes of the musculoskeletal system. They create prerequisites for the development of functional disorders in various parts of the musculoskeletal system and failure of compensation for natural age-related dystrophic processes under the influence of provocative factors. Secondary prevention of back pain is based on compensation or correction of the mentioned risk factors by forming an optimal postural and motor stereotype, increasing extensibility, increasing muscle strength and endurance, increasing tolerance to physical load, strengthening regeneration and repair processes, elimination of psycho-emotional disorders [3]. A distinction is made between vertebral (associated directly with impaired functioning of one or more vertebral-motor segments) and extravertebral (associated with pathological impulsation from the affected spinal segment) manifestations (syndromes) [4].

Vertebral syndromes of spinal osteochondrosis

The forms of degenerative lesions of the spine are presented differently by morphologists, radiologists, and clinicians. I. M. Irger (1971) proposed the following morphological classification of spinal osteochondrosis [5].

1. Intervertebral osteochondrosis:
- internal degenerative-dystrophic changes of the intervertebral discs with preservation or loss of stability of the motor spinal segment
- displacement of the intervertebral discs with their protrusion or prolapse into the lumen of the spinal canal
- anterior and lateral disc protrusions and prolapses
- central disc prolapses (Schmorl's herniated discs)
- scarring changes in the intervertebral discs and surrounding tissues as the final phase of degenerative-dystrophic processes, which in some cases leads to the development of fibrous ankylosis of the motor spinal segment.

2. Reactive changes in the spine:
- deforming spondylosis - marginal bony outgrowths of vertebral bodies
- spondyloarthritis - changes in the joints of the spine, characterized by narrowing of the articular cleft, sclerosis of the subchondral bone, and formation of marginal osteophytes
- degenerative changes of the yellow and interspinous ligaments.

All of these forms are different types of degenerative process in the intervertebral discs and the response to it from the adjacent vertebrae. The clinical manifestations of spinal osteochondrosis in the cervical, thoracic and lumbosacral spine have such significant differences that they should be considered separately.

The main sign of vertebral syndrome is a dysfunction of one or more vertebral-motor segments.

This is manifested by changes in the configuration of the spine (flattening or strengthening of the lordosis, kyphosis, scoliosis, kypho- or lordoscoliosis), and impaired mobility (limited mobility as a result of myofixation or pseudospondylolisthesis).

The second sign is local pain and soreness during active and passive movements. These symptoms are caused by irritation of the recurrent (sinuvertebral) nerve receptors.

The third sign is the loss of spring function of the spinal segment, reduction of the ability of the spine to withstand habitual loads. This is accompanied by a feeling of "spinal fatigue" and discomfort in the back.

Noticeable limitation of movements and forced position of the head, neck, torso, asymmetry of muscle contours indicate the presence of paravertebral muscle spasm. Palpatorily, tension of some muscles of the neck and back, their painfulness on palpation in trigger points, as well as painfulness of spinous processes,

interspinous ligaments, the area of archiliac joints, sacroiliac articulations are determined. Special tests allow detecting non-paretic dysfunction of various muscles, functional blockage of joints of the spine and sacroiliac joints.

Table 1. Signs of lesions in various parts of the spine

Possible localization of a herniated disc	*Pain localization*	*Decreased sensitivity*	*Decreased reflex*	*Paresis*
C4-C5	Outer surface of shoulder, medial part of scapula	Upper part of outer surface of shoulder (above deltoid muscle)	Biceps reflex	Abduction and external rotation of shoulder, partly forearm flexion
C5-C6	Lateral surface of forearm and wrist, I-II fingers	Lateral surface of forearm and wrist, I-II fingers	Reflex from the biceps muscle	Forearm flexion and internal rotation, partial extension of the wrist
C6-C7	Posterior surface of shoulder and forearm up to II-III fingers	II-III fingers, rear surface of the hand and forearm	Reflex from triceps muscle	Extension of shoulder, extension of wrist and fingers, partial flexion of wrist
C7-Th1	Inner surface of forearm, wrist up to IV-V fingers	IV-V fingers, inner surface of the hand and forearm	No	Finger flexion and extension
Th1-Th2	Inner surface of shoulder and axillary area	Inner surface of upper arm and upper arm, axilla	No	Finger extension
L2-L3	Anterior surface of the thigh and knee	Anterior surface of the lower thigh and knee	No	Flexion and extension of the thigh, extension of the lower leg
L3-L4	Inner surface of the knee and upper part of the lower leg	Inner surface of the knee and upper part of the lower leg	Knee reflex	Extension of the tibia and abduction of the thigh
L4-L5	Outer leg surface up to the first toe	Outer surface of the tibia and inner surface of the foot	No	Dorsiflexion of the big toe or foot, internal rotation of the foot
L5-S1	Posterior surface of the foot to the V toe and heel	Outer surface of foot, sole	Achilles tendon reflex	Plantar flexion of the big toe and foot

Extravertebral syndromes of spinal osteochondrosis

Pathological impulsation from the affected part of the spine spreads along the corresponding sclerotomes to certain parts of the body. These syndromes are named according to the localization of pain: cranialgia, thoracalgia, brachialgia, ischialgia, cruralgia, calcaneo-, achillo-, coccygodynia. Besides, painful sensations may irradiate along an extensive vegetative network to the visceral sphere (heart, lungs, pleura, liver, pancreas, intestines) - visceral symptoms. A special group consists of pain syndromes arising from compression of radicles, cauda equina and other parts of the peripheral nervous system. All the mentioned variants of "irradiating" and reflected pains form an amazing variety of extravertebral neurovascular, muscle-tonic, neurodystrophic, vertebro-visceral and neural syndromes.

The classification proposed by I. P. Antonov has been traditionally used in medicine since 1981 [2]. Antonov's classification of peripheral nervous system diseases, which included "osteochondrosis of the spine". It contains two provisions that fundamentally contradict the international classification:

- diseases of the peripheral nervous system and diseases of the musculoskeletal system, which include degenerative diseases of the spine, are separate and distinct classes of diseases
- the term "osteochondrosis" applies only to disc degeneration, and it is inappropriate to refer to the entire spectrum of degenerative diseases of the spine.

Classification of diseases of the peripheral nervous system according to I. P. Antonov:

Vertebrogenic lesions (meaning neurological manifestations of spinal osteochondrosis):

1. Cervical level

1.1. Reflex syndromes

- cervicalgia
- cervicocranialgia
- cervicobrachialgia with muscle-tonic or autonomic-vascular, or neurodystrophic manifestations

1.2. Spinal syndromes

- discogenic (vertebrogenic) lesion (radiculitis) of the roots

1.3. Spinal vascular syndromes

2. Thoracic level

2.1. Reflex syndromes

- thoracalgia with muscle-tonic or autonomic-visceral, or neurodystrophic manifestations.

2.2. Spinal syndromes.

- discogenic (vertebrogenic) lesion (radiculitis) of the roots

3. Lumbosacral level

3.1. Reflex syndromes

- lumbago (arthralgia) - allowed to be used as an initial diagnosis in outpatient practice.
- lumbodynia.
- lumbo-ischialgia with muscle-tonic or autonomic-vascular or neurodystrophic manifestations.

3.2. Spinal syndromes.

- discogenic (vertebrogenic) lesion (radiculitis) of roots

3.3. Radicular vascular syndromes (radiculoischemia).

Instrumental diagnosis of spinal osteochondrosis

Mainly due to the variety of clinical manifestations of osteochondrosis, as well as due to the rather difficult early diagnosis of the disease, there has always been a need for instrumental confirmation of the diagnosis in the practice of vertebrology. Unfortunately, radiography adequately depicts only the bony elements of the spine, without giving an idea of the soft tissue component (spinal roots, intervertebral discs). Only since the second half of the 1980s, the widespread introduction of magnetic resonance imaging into practice made it possible to establish a diagnosis in the early stages of the lesion. At the moment there is an even more advanced diagnostic technology for detecting those changes of the spinal column, which are not visible during conventional MRI examination - this is MRI with functional load. Its main difference is the position of the patient's body during the examination, while in traditional MRI the patient's body is positioned parallel to the

horizontal plane, in functional MRI it is parallel to the vertical plane. Thus, minimal changes become evident, which could have been missed during a standard examination.

Treatment of osteochondrosis and its complications is carried out using conservative methods aimed at elimination of pain syndrome, disorders of spinal root function and prevention of progression of dystrophic changes in the structures of the spine.

If conservative treatment is ineffective and for special indications surgical treatment is performed, the extent of which depends on the level of damage and clinical manifestations of the disease.

The duration of treatment of osteochondrosis and its complications depends mainly on the severity of the disease, age changes, applied methods of treatment, as well as the conscientious performance of prescriptions and recommendations of the attending physician. As practice shows, the active phase of treatment in most cases lasts 1-3 months if conservative methods are used, and the recovery period after surgery is about 1 year. At the beginning of treatment some patients may have increased pain syndrome associated with the reaction of the muscular system and other formations to unusual effects on the body. Painful sensations are stopped within a short period of time by applying physiotherapeutic procedures, medications, as well as special physical exercises. The result of treatment depends greatly on the behavior of the patient, who needs patience, persistence, perseverance, a certain willpower, as well as the desire to heal. The most effective conservative therapy and rehabilitation after surgery can be achieved in conditions of specialized medical centers and sanatoriums, equipped with modern diagnostic and therapeutic base, as well as highly skilled practitioners, applying a comprehensive treatment of diseases of the musculoskeletal system.

Complex conservative treatment includes therapeutic physical training, physiotherapy, massage, manual therapy, spinal traction, reflexotherapy, kinesiotaping and medication therapy.

Therapeutic exercises, kinesitherapy - the main method of conservative treatment of diseases of the musculoskeletal system. It consists of dosed loads aimed at decompression of nerve roots, correction and strengthening of the muscle corset, an increase in the volume and development of a certain pattern of movements and correct posture, giving the ligamentous-muscular apparatus the necessary flexibility, as well as the prevention of complications. This is achieved through regular exercises with rehabilitation equipment and joint exercises. Exercise improves blood circulation, normalizes metabolism and nutrition of the intervertebral discs, increases the intervertebral space, forms a muscular corset and reduces the load on the spine.

Physiotherapy is a method of treatment that uses physical factors: low frequency currents, magnetic fields, ultrasound, laser, etc. It is used to relieve pain, inflammation, rehabilitation after injuries and operations. When using physiotherapy methods shortens the treatment of many diseases, increases the effectiveness of medication and reduce their dosage, there are no side effects common to drug treatment.

Massage - a set of techniques of mechanical dosage effects in the form of friction, pressure, vibration, carried out directly on the surface of the human body by hand. Effectively relieves muscle tension, muscle pain, improves blood circulation, has a restorative effect.

Manual therapy - individualized manual manipulation of musculoskeletal system for relieving acute and chronic pain in the spine and joints, as well as increasing range of motion and correction of posture.

Spine traction is an effective method of treating painful syndromes in the spine and joints, using individually adjusted loads with special equipment. The procedure is aimed at increasing the intervertebral space, relieving pain and restoring the anatomically correct shape of the spine.

Medicament therapy is indicated in acute conditions and is aimed at relieving pain, eliminating inflammatory processes and

increasing metabolic processes by intramuscular or intravenous injections.

Conclusion

In order to prevent osteochondrosis or reduce pain, it is recommended that people suffering from this disease spend as much time as possible in a position with minimal pressure on the intervertebral discs and, at the same time, that the muscles in the back are often stretched in order to maintain metabolic processes around the spine. General recommendations are restricted to the observance of the rules of a healthy lifestyle, besides that a doctor who is treating the patient determines particular recommendations for each particular case.

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