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Imaging studies and indications for surgical treatment of carotid spondylosis

Piotr Porzych, Krystyna Nowacka, Karol Ogurkowski, Joanna Simińska, Magdalena Hagner-Derengowska, Dorota Ratuszek-Sadowska, Wojciech Hagner

Department of Rehabilitation and Clinic Medical College in Bydgoszcz, Nicolaus Copernicus University in Torun

Summary

Cervical spine spondylosis, is the result of a complex process which occurs in the course of normal physiological aging of body tissue. This lengthy process progresses normally for decades as we age. It is believed that it is initiated through early degenerative changes in the intervertebral discs. Surgical operation is only a part of the treatment and it never meets all patient's expectations. The operation alleviates or eliminates direct life threat or loss of health but it is not solving the whole healing problem. Before planning the surgery, the imaging examination are widely used. It is important to remember that the signs of wear of the cervical spine obtained via imaging, do not always correspond to the clinical symptoms.

Key words: cervical spondylosis, imaging, surgery, indications

Introduction

Distorting changes around the cervical spine (spondylosis), commonly known as osteoarthritis, is the result of a complex process which occurs in the course of normal physiological aging of body tissue. It is a progressive, chronic, usually lasting for decades process. Using conservative treatment, effectively we can only delay the course of this

disease. Surgical treatment, in turn, is part of the therapy and it never fully meets the patient's expectations. It alleviates or eliminates direct life threat or loss of health, not solving the whole healing problem.

The etymology and pathogenesis of cervical spondylosis are not fully explained or understood yet. The disease affects not only, as it is commonly believed, vertebrae and intervertebral discs, but also the facet joints, uncovertebral joints, spinal capsular and ligaments.

In addition to the genetic factors that are likely to have the greatest importance in the development of the disease, it is worth mentioning the essential role of changing human behaviour associated with static overload of the spine, the long-lasting and forced head positions. The accumulating micro-trauma, disrupting the biomechanics of the spine, are the causes of developing disfiguring changes in tissue, originating from, as is commonly believed, in the early degenerative changes of intervertebral discs.

The aim of surgical treatment of cervical spondylosis is to decompress neural or vascular structures oppression, and in the case of instability, to restore spinal stabilization. Before planning surgery, imaging examinations are widely used. It is important to remember that radiological signs of wear of the cervical spine does not always correspond to the clinical symptoms [1, 2, 3, 4].

Imaging studies

Imaging examinations play an important role in the diagnosis and treatment of many diseases. Today, imaging completely revolutionized the diagnosis of cranio-cervical-shoulder pain, allowing a significant improvement in the treatment results. On the other hand, it is important to bear in mind that imaging only adds to other clinical assessments [1, 4, 5, 6]. Establishing common criteria for ordering imaging tests is very problematic because of the atypical cases and the presence of numerous forms of a single disease. We also need to be aware of the harmful emissions associated with certain imaging methods. The concerns about patient's health should be kept in mind to make this examination only in cases when it is necessary [7].

Despite the enormous progress in radiology, routine X-ray examination of the cervical spine, has not lost its importance. The examination aims to assess the bone elements of the spine. Pictures are usually performed in the projections: anterior-posterior and lateral. The images can detect traumatic changes, congenital, acquired and spinal vertebrae changes in the structure caused by inflammation or cancer, and degenerative changes overload [2, 3]. Projection anteroposterior exposes disorder of the long axis of the spine and processes uncinatus condition, central portion and lower in the frontal plane. Lateral projection, is performed in order to better assess the degeneration of intervertebral discs [1, 7].

During discographic research, under the control of X-ray monitor, the intervertebral disc is introduced into a predetermined amount of the contrast agent. In the case of a damaged disc, contrast agent penetrates into the sphere of the annulus fibrosus exposing an irregular

shape. With fully serrated ring means moving in the direction of the spinal canal may penetrate to its interior or locate the rear longitudinal ligament. Radiological assessment is usually performed together with clinical symptoms test suitable for the patient [7].

Myelography is the introduction into the subarachnoidal space of contrast absorbing X-rays, a radiological imaging to the dural sac and spinal cord and its nerve roots. Prolapsed intervertebral disc is reflected in the form of compressions or displacement of structures filled with contrast: the dural sac at the height of the intervertebral space or recess the dura and the intervertebral foramina extending the spinal roots [7]. Myelography due to the invasiveness is now rarely used. It is performed most often in case of patients with contraindications to MRI [8].

Radiculography is used to illustrate the nerve roots by introducing a contrast agent into the dural sac via a lumbar puncture. The procedure is similar as the one used during the myelography, the difference is in the position of the patient on the table and radiological contrast enhancement to the nerve roots [9, 2].

Computed tomography can be used to test the entire cervical spine or only a clinically significant part, due to the limitation of the exposure of ionizing radiation. The tomography allows for detailed diagnosis of bone segments of the spine, perispinal and intrathecal tissues [10]. It exposes the width of the spinal canal, the size of the processus uncinatus osteophytes and nerve root neurolemma using the contrast agent [1].

Magnetic resonance imaging provides better contrast between different tissues, demonstrating advantages over other methods of diagnostic imaging [11, 7]. In the process of obtaining the image, we do not use ionizing radiation, therefore it is not associated with the risk of potentially harmful effects of its actions. In patoanatomical spinal images, protrusion of intervertebral discs preferably shows in sagittal sections [12, 13, 14, 7, 15].

Digital Holography System is the latest development in the field of modern imaging methods. Based on data from computed tomography and magnetic resonance imaging, three-dimensional images are generated for watching structures, such as anatomical preparations. Due to the fact that two-dimensional images are not always highlighting the pathological changes in the cervical spine, the digital holography is increasingly important in the diagnosis and treatment [4].

Surgery

If the surgery is expected to bring benefits to the treated patient, it must be properly chosen and performed in a timely manner. There are only two absolute indications for surgical treatment. The first is if the condition is life-threatening, and the second is a threat of severe disability. If conservative treatment makes life neurologically intact while natural symptoms persist, surgery should not be used [4, 16, 17, 18].

The most common indications for surgery are:

- tumorous form of cervical spondylosis,

- signs of severe damage of the spinal core, which may be a reversible if the spinal cord compression is decreased,
- spondylosis stenosis or destabilization of the spine, causing damage to the spinal cord, vertebral artery and anterior spinal artery.

Relative indications include:

- persistent pain which is impossible to reduce,
- neurological non-life threatening and manageable disability symptoms, in the form of numbness, weakness and muscle atrophy and weakness of the limbs,
- recurrent pain, preventing patient from normal work, significantly hindering activities of daily living [4, 3, 2].

Cases in which there are large neurological deficits, in cervical-spinal syndromes require detailed diagnostic imaging as myelography, CT and / or MRI, and early surgical procedure performed. In other cases, cervical syndrome, transition success of conservative treatment and spontaneous remissions occurring in all discogenic diseases, usually allow the patient and the doctor discuss to postpone the surgery. In such cases, surgery may be recommended in the late stages of the disease. The final decisive factor that makes the patient eligible for surgical treatment is to determine if the patient can no longer tolerate more common ailments and wants to undergo the procedure [1, 2].

If motor unit, destabilized due to damage in the mechanism of acceleration or deceleration, cannot be stabilized by conservative methods, it may force the need to perform an operation. [1, 4, 6].

Uncoforaminotomy is recommended in case of persistent pain, dizziness, not susceptible to the conservative treatment, in the head and cervical syndrome caused by osteophytes around the unciform and vertebral region [1, 2, 3].

Indications for surgery is also discomfort, accompanied by excessive radiological images during the opening segment tilt of the head and neck, which was unresponsive to conservative treatment. What is also important, is the result of a test that consists of inserting a small amount of contrast agent into the disc cervical in order to increase the contact parts being subject protrusion of nerve root. Provocation typical pain for the patient has diagnostic significance. Healthy cervical disc can enter 0.2-0.5 ml of liquid. The proof of disc degeneration of dorsal likely to tear the ring is to provide a fluid with a larger volume. Occurring process, called symptom stretching disc with compression of neural structures, provides a more reliable indication regarding the segments, which should be operated, than just a view of the intervertebral disk filled with the contrast agent itself discography. Discography reveals the image of degenerative structural changes and does not give indications on the disc causing patient symptoms. Sometimes, the severely deteriorated degeneration rings, which have been interrupted by annulus fibrosus, do not cause any problems [1].

Summary

The condition of cervical spondylosis is generally known, but there are many varieties with rich symptomatology of the disease. Spondylosis takes on the character of variously occurring syndromes of chronic ischemia and damage to the nervous tissue. During periods of exacerbation, severe irritation symptoms may occur. The indicators for surgical procedures are symptoms determined in a clinical test, often accompanied by an appropriate imaging examination. The most important diagnostic methods for cervical degenerative changes of intervertebral discs that determine whether or not surgery is needed are cervical discography in combination with the disc stretching test. [19, 20].

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