

CERVICAL DISC PROTRUSION – CLINICAL FEATURES

CĂTĂLIN-COSMIN MUTU¹, MARCEL PEREANU²

^{1,2}“Lucian Blaga” University of Sibiu, Clinical County Emergency Hospital of Sibiu

Keywords: cervical disc protrusion

Abstract: Cervical disc protrusion is one of the most frequent pathologies of the cervical spine. The cervical pain irradiated to the upper limbs is the main symptom and it is frequently accompanied by paraesthesia and tingling at the level of the arm, forearm and fingers, sometimes with the decrease of the muscular force at this level. By presenting in this article the particular clinical aspects of the cervical disc protrusion, we would like to raise the attention of the specialists from the medical domain services to this pathology which is under diagnosed and difficult to treat.

Cuvinte cheie: hernia de disc cervicală

Rezumat: Hernia de disc cervicală reprezintă una dintre cele mai frecvente patologii ale coloanei cervicale. Durerea cervicală iradiată la nivelul membrelor superioare este principalul simptom al acesteia și se însoțește frecvent de paretezii și furnicături la nivelul brațului, antebrațului și degetelor mâinii, uneori putând apărea și scăderea forței musculare la acest nivel. Prin prezentarea, în acest articol, a aspectelor clinice particulare ale herniei de disc cervicale dorim să creștem atenția specialiștilor din domeniul serviciilor medicale asupra acestei patologii care este subdiagnosticată și dificil de tratat.

The cervical disc protrusion is one of the most frequent pathologies of the cervical spine. It particularly appears in the adult population aged between 30 and 50 years. Even though it is thought that the cervical disc protrusion, just as the lumbar disc protrusion, appears due to small or large traumas of the vertebral spine, the symptoms appear often spontaneously. The pain irradiated at the level of the upper limbs is the main symptom and it is frequently accompanied by paraesthesia and tingling at the level of the arm, forearm and fingers sometimes with the decrease of the muscular force at this level.(1)

According to their frequency and localisation the vertebral disc protrusions are lumbar (95%), cervical (4-5%) and thoracic (under 1%). These can coexist at some predisposed persons.(2)

Definition

The spinal disc protrusion represents the migration of the central smooth part (nucleus pulposus) towards the exterior of the intervertebral disc, resulting in the compression or even breakage of the fibre ring from the exterior frame. The migration of the nucleus pulposus results in the compression of the spinal nerve roots at the level of the conjugation holes which causes cervicobrachial radiculopathy (intraforaminal hernia) or can compress the cervical spinal cord determining cervical myelopathy (median hernia).(2)

Epidemiology

Most frequently appears at persons aged between 30 and 50 in the 4th -5th decades. In males it is 2 or 3 times more frequent than in females.(1).

The distribution of the symptoms is 60% monoradicular and 40% poliradicular.(3)

Etiology

There is a certain genetic predisposition in the disc protrusion proven by the fact that there are certain families which suffer more frequently from this affection. There were

described several mutations of the coding genes related to the proteins involved in the regulation of the extracellular matrix, such as MMP2 or THBS2.(4)

Among the most important predisposing factors we particularly mention *the disc degenerative phenomena* being more accentuated in the mobile, caudal area of the segments being transitory towards the relatively rigid dorsal spine on which the *repeated microtrauma* is overlapped, more rarely a direct accidental trauma at the level of the cervical spine. Other favourable factors are the repeated rotational movements of the head and the prolonged kyphotic cervical attitude (ex. reading, working at a table).(2,3)

Pathophysiology

In an earlier stage a sudden pressure on the nucleus pulposus exercised by the bones of two adjacent vertebrae can produce a disc protrusion, which can determine the swelling but not the rupture of the fibre ring, which remains injured. Subsequently, during the evolution, the disc protrusion appears which means that the nucleus pulposus is herniated by the apparition of a continuity solution at the level of the fibre ring. Because of the existence of the posterior longitudinal ligament this is most frequently produced in a postero-lateral direction resulting in the different degree of compression of the spinal roots. The break of the fibre ring produces the release of pro-inflammatory chemical mediators which can be a direct cause of the severe pain after the disc protrusion, even in the absence of the nerve root compression.(2)

There are more and more proofs attesting that the pain caused by the disc protrusion is both due to the mechanic compression of the nerve's roots or of the spinal cord and to the chemical inflammation. The specific inflammatory mediator determining the apparition of the pain is defined as being the alpha factor of the tumour necrosis (TNF). Together with the pain and inflammation TNF contributes to the disc

¹Corresponding author: Cosmin Mutu, Str. Pompeiu Onofrei, Nr. 2-4, Sibiu, România, E-mail: cosminmutu@yahoo.com, Tel: +04074 2931011
Article received on 02.07.2014 and accepted for publication on 20.08.2014
ACTA MEDICA TRANSILVANICA September 2014;2(3):258-260

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degeneration.(4,5,6,7,8)

Clinical Picture

The cervical disc protrusion appears most frequently at the level of C6-C7 (50%) and C5-C6 (30%) and rarely at the level of C7-T1 and very rarely at the level of C4-C5.(1,2,3)

From a clinical point of view it evolves in 3 phases:

Phase I (painful) usually appears acute in spurts, with a slow progressive evolution without an apparent cause and manifests itself by an intermittent *irritative syndrome*.

The patient presents cervicalgia accompanied or not by acute, intense, unilateral, rarely bilateral brachialgia in 60% of the cases monoradicular, in 40% of the cases poliradicular and can be accompanied by paraesthesia and tingling.

Often these can appear after a sudden movement of the cephalic of the extremity (lifting something heavy, violent cough) under the form of an intense pain in the posterior cervical area, which exacerbates when the cephalic extremity is moved. Paravertebral muscular contraction appears with cervical block and with the apparition of an antalgic position of the head. The evolution is generally benign.(2)

Phase II (neurological pain) manifests itself by a *compressive sensitive syndrome* which can be accompanied by a motor compressive syndrome.

This is due to the cervical root's compression and can happen progressively, after more spurts in the 1st phase or suddenly. The pain is intense, localised in the posterior and lateral cervical area irradiating towards the shoulder, arm, forearm until the fingers. The algic complaints are exacerbated during the active and passive movements of the head, during the coughs, sneezes or defecation.

An intense contracture of the scapulohumeral muscles appears which poses serious differential diagnosis problems with the scapulohumeral periarthritis. The presence of a motor disorder can be observed at the level of the affected roots.(2)

The sensitive cervical radicular and motor syndromes are synthesised in the following table:

Table no. 1. Cervical radicular semiology

Rădăcină (nivel disc)	Deficit senzitiv	Deficit motor	Reflexe diminuate
C5 (C4-C5)	Gât și zona laterală umăr	Deltoid, supra+subspinos	Supinator
C6 (C5-C6)	Fața radială a brațului și antebrățului, până la police	Biceps, brahioradial, lungul supinator	Bicipital
C7 (C6-C7)	Latero/dorsal braț și antebrăț, degete 2-4	Triceps, pronator, extensori pumn, degete	Tricipital
C8 (C7-T1)	Dorsal braț și antebrăț, degete 4-5	Flexori degete, mușchi intrinseci ai mâinii	

In the compression of the C4 root pain is felt in the lateral cervical area with irradiation in the clavicle and shoulder, accompanied by paraesthesia and hypoesthesia in the same area. From a motor point of view we notice affection of the homolateral diaphragm and of the large toothed muscle.

The affection of root C5 produces a pain at the level of the shoulder. He objective sensitivity disorders manifest by hypoesthesia in the same area. We notice motor deficit of the deltoid, brachial biceps muscle, over and under the spine. The osteotendinous biceps reflex is abolished.

By the compression of root C6 pains on the antero-external part of the arm, on the forearm, thenar eminences and on the thumb appear. We notice paraesthesia and hypoesthesia at the level of the thumb and index. The radial and biceps muscles are affected at a motor level. The osteotendinous stilo-radial reflex is abolished.

In the compression of root C7 we notice the apparition of algic complaints, paraesthesia and hypoesthesia at the level of the first finger, index and fourth finger. The **triceps** and big

volar muscles are affected from a motor point of view. The osteotendinous triceps reflex is abolished.

The compression of root C8 produces pain, paraesthesia and hypoesthesia at the level of the internal part of the forearm, hypothenar eminence and fourth and fifth finger. Paresis can appear at the cubit and little muscles of the hand. The cubitopronator reflex is abolished.(2)

Phase III (of compression) of the cervical discopathy is manifested by a *medullary compression syndrome* with cervical vertebral myelopathy or with the apparition of the posterior cervical sympathetic syndrome. It appears in the median or paramedian hernia and determines progressive paresis or chronic spastic tetraparesis with poor medullary sensitive symptoms the Lehmmittle sign being present and rarely sphincter disorders.(2,10)

The clinical table of the cervical disc protrusion is very frequently accompanied by *secondary non-specific symptoms* which can lead to a wrong diagnosis established by the physician who is not used to this type of pathology. These frequent symptoms are occipital or frontal cephalalgia, non-systematic dizziness, tinnitus, nuchal paraesthesia, irritability and depression.(9)

At the objective examination of the patient we find:

- Vicious attitude with stiffness of the hind head and flexion of the head.
- Pain by pressing the spinous and transverse process, the muscles of the hind head, the emergency of the occipital nerves, the scapular area.
- Pain at the declension of the cervical spine, at the rapprochement of the sternum chin.

Tests can be done to orient the clinical diagnosis.

These are:

- Neck compression test: a radicular pain appears at an axial compression with rotation and bending of the head in the painful part.
- Hyperextension test: ease of pain by axial traction of the head in a sitting position (3,9)

The positive diagnosis is established based on the presence of the specific clinical table, filled out with the appropriate image investigations: radiologic examination of the vertebral spine in 4 incidences (front, profile, sideway), magnetic nuclear resonance of the cervical spine, electromyography and bone scintigraphy in particular cases.(10)

Conclusions:

Cervical disc protrusion is a frequent pathologic entity, with specific symptoms but in the same time difficult to diagnose by the not trained medical personnel. Its incidence in the general population is in reality a lot bigger than the diagnosed cases. The diagnosis is established based on an anamnesis, clinical and paraclinical examination (the magnetic nuclear resonance of the cervical spine is the best examination method).

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