Low back pain – a diagnostic approach

Dor lombar – uma abordagem diagnóstica

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ABSTRACT

BACKGROUND AND OBJECTIVES: Low back pain is a problem that affects 80% of adults at some point in life, it is among the top 10 primary causes of consultation with internists and, every year, workers are absent from work for more than seven days due to this disease, causing a great impact in productivity and economy. The objective of this study was to provide the clinician working at the primary care with an adequate approach to the patient with chronic low back pain, emphasizing the differential diagnosis of this disease.
CONTENTS: The etiological characterization of low back pain is a process that requires a propaedeutic approach that includes the clinical history, physical and complementary exams. The approach to low back pain of mechanical origin, and others less common such as those with a neuropathic component or resulting from inflammation, infection or neoplasia was developed, based on the literature.
CONCLUSION: The diagnosis of low back pain is essential, yet challenging for the primary care physician. Most patients with back pain can be treated at the primary care setting, provided that the GP has the proper knowledge to elaborate the differential diagnosis of this disease.

Keywords: Diagnosis, Low back pain, Primary care.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor lombar é um problema que afeta 80% dos adultos em algum momento da vida, está entre as 10 primeiras causas de consultas a internistas e, em cada ano, trabalhadores se ausentam de suas atividades por mais de sete dias em razão dessa doença com grande impacto na produtividade e redução da economia. O objetivo deste estudo foi fornecer ao clínico que trabalha no atendimento primário uma maneira de abordagem adequada do paciente com dor lombar crônica, enfatizando o diagnóstico diferencial dessa doença.
CONTEÚDO: A caracterização etiológica da dor lombar é um processo que exige uma abordagem propedêutica que inclua história clínica, exame físico e exames complementares. Foi desenvolvido, baseado na literatura, abordagem de dor lombar de origem mecânica, e outras menos comuns, como as que cursam com componente neuropático ou decorrentes de inflamação, infecção ou neoplasia.
CONCLUSÃO: O diagnóstico da dor lombar é essencial, porém desafiador, para o médico no atendimento primário. A maioria dos pacientes portadores de lombalgia pode ser tratado no ambiente de atendimento primário, desde que o médico assistente tenha conhecimento apropriado da forma como elaborar o diagnóstico diferencial dessa doença.

Descritores: Atenção primária, Diagnóstico, Dor lombar.

INTRODUCTION

According to MeSH (Medical Subject Headings), chronic pain is a painful sensation lasting a few months, and may or may not be associated with trauma or disease, and persists even after the healing of the initial injury.
Back pain (BP) is one of the most common health problems in adults. It is defined as located pain and discomfort below the costal margin and above the superior gluteal line, with or without related pain in the lower limb, being chronic if it persists for three months or more[1].
BP is a problem that affects 80% of the adults at some moment in life[2], and it is among the top 10 causes of consultation with internists and, every year, 5 to 10% of workers miss more than seven days of work due to this disease[3]. A study carried out by the group of chronic non-communicable diseases of the Institute of Collective Health of the Federal University of Bahia, showed a 14.7% prevalence in the total population of Salvador, and found statistically significant differences in those older than 60 years (18.3%)[3].
Chronic back pain (CBP) is a complex, heterogeneous medical condition that includes a wide variety of symptoms[4]. Also, it is a frequent cause of morbidity and disability, being surpassed only by headache in the scale of the painful disorders affecting people[5].
In clinic practice, patients with CBP are categorized into three groups: 1) associated with a specific underlying disease; 2) with the presence of a neuropathic component, that is BP associated with an injury or disease of the somatosensory nervous system; 3) non-specific, which in most cases is of mechanical origin[6] (Table 1). It is observed that in the non-specialized primary care,

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only 15% of back pain are related to a specific cause (trauma, infection, inflammation, rheumatoid arthritis, tumor, disc hernia, vasculopathy etc.), and there is no evident organic cause in 75%[7,8].

The objective of this study was to provide the GP working in primary care an appropriate approach to the patient with chronic low back pain, emphasizing the differential diagnosis of this disease.

CONTENTS

Several factors have been associated with the presence of CBP, such as being older than 30 years, male, smoking, alcohol abuse, obesity, incorrect posture, mood disorder, low social level and education, sedentarism and work activities that demand efforts with excess of flexion, rotation, vibration on the chest and carrying weight[9].

However, the approach to CBP can be difficult due to the non-existence of a trustworthy correlation between the clinical and image findings. The fact of the lumbar segment be innervated by a diffuse and interwoven network of nerves, makes it not always possible to establish with accuracy the site of the CBP origin. Thus, the etiological characterization of low back pain is a process that requires a propaedeutic approach that includes clinical history, physical and complementary exams[10].

Although there is no one defined cause for non-specific back pain, the diagnosis is frequently associated with the musculoskeletal system. Pain may be due to 1) the degenerative process of the small posterior joints, causing irritation of the spinal nerve roots; 2) the intensification of lordosis due to an increase in the curvature of the spine; 3) the weakness in the abdominal muscles that causes greater pressure on the facet joints; 4) the asymmetry of the facet joints. The clinical manifestation consists of pain in the lumbar region, of sudden or slow installation, blocking the movements and determining an attitude of rigidity of the lumbar spine. Lumbago of mechanical origin can be caused by disorders in muscles, tendons, and ligaments. Usually, it can be attributed the activities such as lifting weights and remaining seated or standing for a prolonged time. Pain is reported as a weight and worsens by the end of the day due to the activities and the physical efforts. There are no neurological signs associated, and coughing or sneezing does not exacerbate symptoms. The onset is insidious, and the patient is usually sedentary, obese, with weak muscles of the lumbar spine and abdomen, buttocks, with shortening of the hamstring muscles[11].

The myofascial pain syndrome may be present in the vast majority of patients with low back pain, either as a primary factor or as a component of muscle contraction due to the segmental reflex pain. The diagnosis is made by medical history, and the physical examination reveals the presence of trigger points (TP) in the muscles involved[12]. The main muscles involved are the paravertebral, abdominal, gluteal, piriformis, quadratus Os principais músculos acometidos são os abdominais, os glúteos, o piriforme, o quadrado lombar e o iliopsoas. Although the mechanisms of the disease are still not totally clear, it is possible that the spinal neuronal plasticity is a key factor that determines the painful hypersensitivity. Thus, it is important to approach both the local and systemic cause factors that facilitate the persistent muscle contraction such as alteration induced in the central nervous system by pain and inflammation[13]. The myofascial TP presents a local increase of prostaglandin, bradykinin, serotonin, norepinephrine, tumor necrosis factor, interleukin 1, peptide/calcitonin-related gene and substance P, and pH reduction when compared to normal controls. Thus, untreated active TP may be peripheral secondary focal points of pain, able to start, amplify and perpetuate the central sensitization and may be related to the presence of CBP[14].

Table 1. Most common causes of lower back pain[6]

Mechanics (80 to 90%)
Unknown cause – attributed to muscle tension or ligament injury (65-70%)
Disc degeneration or joint disease
Spine fracture
Congenital deformity (such as scoliosis, kyphosis, transitional vertebra)
Spondylosis
Instability
Neurogenic (5 to 15%)
Disc hernia
Spinal stenosis
Osteophyte injury of nerve root
Annular fissure with chemical irritation of the nerve root
Syndromes due to surgery failure on the spine (arachnoiditis, epidural adherence, recurrent hernia)
No mechanical conditions (1 to 2%)
Neoplasia (primary or metastatic)
Infections (osteomyelitis, discitis, abcess)
Inflammatory arthritis (rheumatoid arthritis, spondylarthropathies, reactive and enteropathic arthritis)
Paget Disease
Other (Scheuermann's disease)
Referred visceral pain (1 to 2%)
Gastrointestinal disease (inflammatory bowel disease, pancreatitis, diverticulitis)
Kidney disease (lithiasis, pyelonephritis)
Abdominal aortic aneurysm
Others (2-4%)
Fibromyalgia
Somatoform disorder
Simulation

BP investigation, however, must be directed to determine the main causes of the disease and the literature suggests that healthcare professionals need to pay attention to the red and yellow flags, that are a set of warnings for the clinical investigation and prognosis of factor[15]. Red flags indicate the possible cause of higher morbidity, while yellow flags suggest the risk of recurrence of the problem or of a worse prognosis to treatment response even when it comes to BP of mechanical origin[16].

On the other hand, despite the nomenclature, not always a red flag indicates the presence of severe disease. It emphasizes the need to differentiate a mechanical from a non-mechanical cause. Table 2 summarizes some possibilities related to clinical history data. A large number of these situations should be referred to an orthopedist or a neurosurgeon, except for CBP with no other signs of alarm, that should be referred to a multidisciplinary team.

Yellow flags are signs that may indicate recurrence of BP in addition to the functional deficit as well as absences from work. Unlike the red flags that indicate primarily physical risks, the yellow flags suggest psychosocial risk factors. Also, they can indicate that some aspect of the person's life directly interferes in pain and, therefore, requires a more detailed investigation or a more focused intervention. Yellow flags can be related to the attitudes and beliefs regarding pain, to emotions and painful behavior, to compensatory aspects, to the family, the work, the diagnosis and the treatment (Table 3).

The neuropathic component of the chronic back pain can be caused by nociceptive stimulus related to 1) nerve sprouting inside the degenerated vertebral disc; 2) mechanical compression of a nerve root, and 3) release of inflammatory mediators by the injured disc but with no mechanical involvement[17].

Thus, it is necessary to develop tools based on questionnaires, neurological examination and sensitive quantitative test to get the diagnosis of neuropathic pain. A systematic review with meta-analysis reported a high frequency around 36.6% of neuropathic component in chronic low back pain, with variation depending on the diagnosis method used between 16.7 and 54.4%[18]. In Germany, the application of PainDETECT on 8,000 patients evaluated who reported chronic low back pain found that 37% of these patients had a painful condition with neuropathic predominance[19].

Table 3. Yellow flags[15,16]

Depressive or negative mood (major risk factor for chronicity), social isolation.
The belief that pain and the maintenance of activity are harmful.
"Unhealthy Behavior" (insistence on staying home for long periods).
Previous treatment that does not comply with the best practices.
Indications of exaggeration in the complaint and hope of reward. History of excessive use of the medical certificate.
Problems at work, job dissatisfaction. Hard work with few leisure hours.
Family overprotection or little family support.

The percentage of the neuropathic component was higher in patients with typical root pain or in those with previous surgery with no satisfactory result. Another issue is that, even with intervention on patients with sciatica, the sciatic component may persist, which favors the hypothesis of central sensitization as the pathophysiological mechanism that maintains pain[20]. In a study with 622 sciatica surgery patients, 53% of them remained with sciatica after four years, and among those who resolved the sciatic component, 61% maintained the lower back pain[21]. It is possible that certain diseases that come with sciatica have greater or lesser neuropathic component (spinal canal stenosis and patients with multiple spine interventions). Also, among the existing diagnostic questionnaires, there is variation in specificity and sensitivity. The LANSS offers sensitivity ranging from 82 to 91% and speci-

Table 2. Red flags in the evaluation of low back pain and investigation strategies[15,16]

Result	Possible diagnosis				Investigation strategy		
	Cauda equina syndrome	Fracture	Cancer	Infection	CBC, CRP or ESR	X-rays	MRI
>50 years old with a history of trauma or >70 years old		X	X		X**	X	X
Fever, chills, sore next to the spine, ICU or recent skin infection				X	X	X	X*
Moderate to severe trauma		X				X	X
Pain at night or at bedtime			X	X	X**	X	X*
Motor deficit or progressive sensitive	X		X				XE
Saddle anesthesia, sciatica, weakness in the legs, urinary retention, fecal incontinence	X						XE
Unexplained weight loss			X		X**	X	X
History or suspicion of cancer			X		X**	X	X*
History of osteoporosis		X			X	X	X*
Immunosuppression				X	X	X	X*
Chronic use of corticosteroids		X		X	X	X	X*
Use of intravenous drug				X	X	X	X*
Psychoactive substance abuse		X		X	X	X	X*
Therapy failure after 6 weeks of treatment (maintenance or worsening of the picture)		X	X	X	X**	X	X*

ICU = Infection of the intestinal tract; CBC = complete blood count; CRP = reactive protein; ESR = erythrocyte sedimentation rate; MRI = magnetic resonance imaging; * Consider nuclear magnetic resonance for investigation sequence; **Consider prostate-specific antigen (PSA); E-Emergency Assessment.

ficity between 80 and 90%, while the DN4 has 83% sensitivity and specificity of 90%. The PainDETECT has 85% sensitivity and specificity of 80%. When differentiating root low back pain from axial low back pain, the StEP had 79% sensitivity and 98% specificity compared to DN4 that obtained 61% sensitivity and specificity of 73%. When compared to the results of the nuclear MRI, the StEP kept superior results with 90% sensitivity and 95% specificity versus 86 and 41% of NMRI[19]. These differences will interfere with the occurrence of neuropathic pain in chronic low back pain[22].

Another study[23] evaluated the presence of neuropathic pain applying the DN4 in patients with sciatica in an attempt to determine if the neuropathic component would be from the lumbar region or the distal part of the leg. Of the 132 patients studied, 40 had a disc hernia, 24: facet arthropathy-related spinal stenosis, 17: degenerative disc disease: 56: degenerative spine disease and two: scoliosis. Thirty patients (23%) underwent spine surgery: discectomy (n=18), chemonucleolysis (n=2), Laminectomy (n=7) and lumbar arthrodesis (n=3). Patients were classified into four groups according to The Quebec Task Force Classification of Spinal Disorders (QTFSD), being group 1 with irradiating pain to the gluteal line, group 2 with irradiating pain to the knee, group 3 with irradiating pain beyond the knee and with no neurological changes and group 4 with pain until the foot, following the distribution of the dermatome and with neurological alteration (sensory loss or alteration of reflection). In group 4, pain impaired mostly the L5-S1 path than L4. There were no differences between the demographic patterns (gender, age, race, or pain treatment) inter groups, however, as expected, the neurological change was more prevalent in group 4, as well as the higher consumption of anticonvulsants. Also with DN4, scores ≥ to 4/10 were higher in group 4, with a sensitivity of 80% and specificity of 92%. With respect to low back pain, there was a higher proportion of scores ≥ to 4/10 in group 4, and it was different in all groups. The same occurred in low back pain with irradiation, except that the scores were statistically similar between groups 2 and 3. The proportion of patients with a positive score for neuropathic pain in lower limb and negative for low back pain was 7.4% in group 2, 23.7% in group 3 and 51.8% in group 4. The number of patients with positive neuropathic pain in the DN4 assessment of low back pain was higher in the group that underwent previous surgery. This may be explained by changes resulting from the tissue healing or nerve injury at the surgery site.

Regarding the pharmacological treatment, before prescribing, the guidelines recommend that GPs evaluate the patient, including pain assessment, the functional impairment and an analysis of risks/benefits of each therapy[24].

The treatment of chronic low back pain involves several drugs. The most commonly prescribed drugs for CBP pain include simple painkillers, non-steroid anti-inflammatory drugs (NSAIDs), muscle relaxants, opioids, and antidepressants[25]. It is prudent to use painkillers for the shortest time necessary, discontinuing them when there is no result or when the patient has intolerable adverse effects. Antidepressants are part of the first-line treatment of neuropathic pain. However, its use in nonspecific CBP is still controversial.

Tricyclic antidepressants, on the other hand, can have a place on CPB treatment for patients who are able to tolerate its sedative and anticholinergic effect. Evidence points to the use of low dose of tricyclic drugs. These drugs should start with a low dose, for example, amitriptyline 10 to 25 mg at bedtime, an increase of 10 to 25 mg per week, up to 75 to 150 mg or as tolerated[26].

Selective inhibitors of serotonin reuptake, on the other hand, do not seem to be effective. Some serotonin-norepinephrine reuptake inhibitors were approved for use in diabetic neuropathy and fibromyalgia, raising the issue of the usefulness of these agents in CBP, mainly, in sciatica and in the spinal canal stenosis where the neuropathic component is present. Bupropion, Venlafaxin and Duloxetine were tested to provide analgesia for these conditions. However, there are few clinical trials on its use for CBP, with conflicting results[27-30].

CONCLUSION

The diagnosis of low back pain is essential, however challenging, for the physician in primary care. Most patients with low back pain can be treated in this environment provided the physician has the proper knowledge on how to elaborate the differential diagnosis and identify the various components of pain. Therefore, the clinical history, physical and neurological examination, the request for supplementary exams and the use of diagnostic tools are essential. This implies appropriate therapy planning, focused on CBP patients, balancing patient's expectations about the treatment outcome.

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