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DIAGNOSTIC AND THERAPEUTIC APPROACH TO LUMBOCHITALGIA

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Abstract: Lumbosciatalgia is pain in the lumbar spine that radiates to the hip, outer thigh, back of the leg and outer edge of the foot to the toes. It is due to an involvement at the level of L4-S3, which makes up the sciatic nerve, causing pain of great intensity and intermediate duration that can affect the quality of life.

OBJECTIVE: To describe the latest updates on the diagnosis and treatment of lumbosciatica through a bibliographic search of high-impact scientific articles in order to know the correct management of this pathology in order to avoid complications in the lives of patients who suffer from them.

METHODS AND MATERIALS: Descriptive, retrospective study obtained from bibliographic sources such as: PubMed, Google Scholar, Scielo, published in the last 5 years that contribute on the topic.

RESULTS: 30 bibliographic reviews were listed, describing the definition, epidemiology, classification, risk factors and methods for diagnosis and treatment.

CONCLUSION: Lumbosciatalgia is very prevalent in the population; it is one of the most common reasons for consultation in primary care. The diagnosis is based mainly on taking a correct history and physical examination; Imaging tests are not recommended. The treatment consists of general measures such as good posture, avoiding carrying weight, losing weight; as well as non-pharmacological treatment, which are massages, electrotherapy, acupuncture and heat therapy, accompanied by the medication of choice such as paracetamol or second-line NSAIDs.

INTRODUCTION

Lumbosciatalgia is a pain that occurs in the spine, which goes from the lumbar region and radiates to the hip, buttocks and even the legs due to involvement of the sciatic nerve, either due to inflammation or compression. of the

roots of the lumbosacral nerve that goes from L4 -S3 and which can manifest functional limitations. It can be defined as acute when it lasts less than 12 weeks; once this time passes, it is considered chronic. (1)

It is a pathology that is very prevalent in the general population, its presentation occurs in approximately 9.4% of the global population, being more frequent between 25 to 49 years of age, it affects the population of working age, so it brings with it a great impact not only in this area, but also socially and economically. It is in sixth place among the pathologies that cause the greatest burden of disease globally. (2)

The World Health Organization in 2018 estimated that in Latin America and the Caribbean, occupational diseases were between 1 to 5%. In the United States, it is the most common cause of activity limitation in people under 45 years of age, the second most common cause of visits to family doctors, the fifth most common cause of hospital admissions, and the third most common cause of surgical procedures. In the United Kingdom, this pathology is the leading cause of work disability; it is estimated that 75 to 80% of the population will suffer from low back pain at some point and 10% will develop chronic pain. (3)

Low back pain is one of the most common reasons for consultation in primary health care. With an incidence of 5% per year, with a prevalence of 60 to 70% throughout life, more frequently in women and at older ages, that is, between 80 and 89 years of age.(4) For this reason, it is considered a topic of great importance in our environment since its condition, if not diagnosed and treated in time, can have consequences in the life of the patient who suffers from this type of pain.

In the present work we propose to describe the latest updates for the diagnosis and treatment of lumbosciatica through a bibliographic search of high-impact scientific articles in order to know the correct management of this pathology in order to avoid possible complications of this disease that can even lead the patient to functional limitation.

DEVELOPMENT

LUMBOSCIATALGIA

Lumbosciatalgia is defined as a pathology that causes pain in the lumbar spine that radiates to the hip, the external region of the thigh, the posterior and external surface of the leg and the external edge of the foot up to the fifth toe. This may be due to the fact that there is involvement at the level of L4 to S3, which make up the sciatic nerve, thus causing pain of great intensity and intermediate duration that can affect the patient's quality of life. (2)

SPINE EMBRYOLOGY

In the third week of development, due to gastrulation, the embryo is like a trilaminar disc, with 3 germ layers: ectoderm, mesoderm and endoderm. On day 19, the intermediate layer differentiates into 3 parts: paraxial, intermediate and lateral mesoderm. On day 20, the paraxial is organized into segments called somitomeres, they are found in the cephalic to the occipital region, surrounding the neural tube, and the region from the occipital to the caudal part is organized into somites. In the fourth week, the somite forms: dermatome, myotome and sclerotome. From the latter, osteoblasts, chondroblasts and fibroblasts are derived for osteogenesis; they give rise to the bones of the axial skeleton, with the exception of some bones of the skull and face. (5)

During the first 4 months of embryonic development the sclerotome changes its position to surround the spinal cord and notochord. This condenses and begins to

form the vertebral body, the development of the appropriate forms of these is regulated by HOX genes. The less dense part that separates from the sclerotome becomes the intervertebral discs. The notochord disappears in the segments of the sclerotome, which is the vertebral body, but persists in the discs as the nucleus pulposus, together with the annulus fibrosus fibers they will make up these discs. And the myotomes will close the intervertebral spaces, allowing muscle development. The thoracic and sacral curvatures are formed during fetal development while the cervical curvature forms after birth. (5)

SPINE ANATOMY

It is made up of 33 vertebrae, which are divided into: 7 cervical, 12 thoracic, 5 lumbar and the sacrum is created by the fusion of 5 vertebrae, while the coccyx consists of the fusion of coccygeal segments. The vertebrae vary in size, with the cervical ones being the smallest and the lumbar ones being the largest. There are some structures which help support the weight of the body, the weight of the upper part is distributed throughout the spine to the sacral part and the pelvis. (6)

Each vertebra is located on top of the other and between each of them, there are intervertebral discs which help absorb pressure, distribute the tension that exists and prevent the vertebrae from rubbing against each other. Therefore, it fulfills some important functions such as: protection of the spinal cord and nerve roots; It is the basis for the support of ligaments, tendons and muscles; It intervenes in balance and weight distribution, in addition to allowing mobility and flexibility of the body. (2)

LUMBAR SPINE

It is made up of 5 vertebrae, ranging from L1 to L5 and they are the largest. It is related to the trunk and lower limbs, it is the lower part of the back, where the spine curves towards the abdomen, which is known as physiological lordosis, which measures approximately 15 to 20 cm. This part of the spine is the one that must support the most weight, therefore they are the most likely to suffer damage or degrade, especially in adulthood. (7)

SCIATIC NERVE

It is the largest and longest nerve in the human body, it is mixed since it is made up of both sensory and motor spinal nerve fibers that go from L4 to S3, that is, from the fourth lumbar vertebra to the third sacral vertebra, then they leave the pelvis passing through the greater sciatic notch and go to the gluteal region below the piriformis muscle, where these five nerves join and descend through the hamstrings until they reach the popliteal fossa, at the back of the knee, where it bifurcates into two groups of nerves: the tibial and peroneal; The first continues its journey towards the feet and innervates the heel and sole of the feet, while the peroneus goes laterally along the outside of the knee and reaches the top of the foot. (8)

The sciatic nerve provides sensation and strength to the legs, for this reason, if there is a problem in this nerve, it can cause weakness in the muscle, numbness or tingling in the lower limbs, which can reach the ankle, the foot or even the toes. (2)

EPIDEMIOLOGY

Lumbosciatalgia is a pathology that predominates in our population, with a prevalence ranging from 60 to 70%, it is considered one of the most common reasons for consultation in primary health care, it is considered to predominate more in women.

than in men, especially when they reach an older age, between 80 and 90 years old, but it is worth emphasizing that this pathology considerably affects people who are in the workplace, especially those who undergo constant handling with heavy loads. However, low back pain is also common in sedentary patients, who maintain a light work activity, which does not involve carrying heavy objects, who spend more than 6 hours sitting and with incorrect postures. (4)

According to data from the World Health Organization issued in 2021, approximately 1.71 billion people suffer from musculoskeletal disorders in the world and low back pain is the most common, affecting 568 million people and responsible for causing disability in 160. countries. (9)

In Ecuador, a study was carried out at the N1 health center in the city of Ibarra, during the period from January 2017 to November 2020, in which patients who presented low back pain as a reason for consultation were included, regardless of their ages. Obtaining a total of 2055 queries during this period. Low back pain was more frequent in women with 64.18%, compared to men, which corresponds to 35.82%.

%. The frequency of consultations in both men and women was between 28 and 60 years old, predominating groups that are of working age. (4)

CLASSIFICATION

It can be classified according to the time of evolution of the pathology, as follows:

ACUTE LUMBOSCIATALGIA:

It refers to pain that lasts less than 6 weeks.

SUBACUTE LOW BACK PAIN:

When the pain manifests itself for 6 to 12 weeks.

CHRONIC LUMBOSCIATALGIA:

It is when the pain lasts for more than 12 weeks.

RECURRING

Acute low back pain in patients who have already had previous episodes of low back pain in a similar location, with asymptomatic episodes lasting more than 3 months. (10)

The natural history of lumbosciatica has a good prognosis; it is estimated that 30% of patients improve during the first two weeks and approximately 90% after two months. Although the majority tend to improve, 25% of those who suffer from it remain in pain for at least the first three months and this can even last for more than three months. (4)

FACTORS OF RISK

There are different factors that can be considered risk factors for promoting this type of low back pain, and they can be better classified as: non-occupational and occupational. (eleven)

NON-LABOR

- ·**Age:** After the age of 50, the risk of suffering from lower back pain increases.
- **Gender**: It affects both genders, however, it predominates more in women than in men.
- **Increase in Body Mass Index:** That is, greater than 25; patients who are overweight or have some degree of obesity.
- **Height:** The taller the patient, the more the discs and joints of the spine suffer more, since, when leaning forward, the pressure supported by the lumbar disc is greater than in a person with a short stature.
- **Sedentary lifestyle:** That is, the person does not have exercise habits, or remains in the same position for more than 6

hours. (2)

- **Sports physical activity:** The ones that most tend to have consequences on the lumbar area are sports such as basketball and volleyball, because, during the practice of these, since these games are characterized by jumping, and when the person performs these jumps, joints and ligaments absorb the impact of landing, which can cause injury.
- **Personal history:** Suffering from spinal problems, including herniated discs.
- **Family history:** That someone in the family suffers from lumbar diseases. (12)

LABOR

- **Lifting weight:** It implies that the person performs tasks that involve lifting and transporting heavy loads, with sudden or forced movements.
- **Tasks with exposure to whole body vibrations:** This can cause some alteration in the lumbar or sacral area, affecting the sciatic nerve and causing lumbosciatalgia.
- **Non-ergonomic postures:** This refers to the person being held in inappropriate positions, and even in rigid seats, which together can cause injuries to the spine. (13)

CLINICAL PICTURE

Lumbosciatalgia can manifest itself by presenting pain in the lumbar area that radiates to the gluteal part, posterior region of the thigh and leg, and even reaches the sole and toes of the foot. This is accompanied by a feeling of rigidity, inability or difficulty in making movements, and on some occasions it usually manifests tingling, weakness of the lower extremities that can be one or both, depending on the nerve root that is compressed. (14)

There are also signs and symptoms considered warning signs, which lead us to think that the disease is progressing rapidly or that there is an underlying disease that produces these symptoms. (10)

WARNING SIGNS

- Age over 50 years
- History of neoplasia
- Weight loss without improvement with treatment
- Fever
- Recurrent infections
- Trauma
- Immunocompromised patient
- Prolonged use of steroids
- Bladder or rectal incontinence
- Intravenous drug addiction
- Neurological deficit of sudden onset or rapidly progressive (10)

DIAGNOSIS

To reach the diagnosis of this pathology, it is important to start with a good anamnesis, in order to know in detail about the patient, from their personal pathological history, as well as their family members; In addition to knowing what he does, that is, if his job consists of spending a few hours sitting in the same position or if he works with heavy loads. The interrogation will also help us to know important aspects such as: when the pain started, its characteristics and the factors that trigger it, increase or decrease it. (fifteen)

In addition to knowing the characteristics of the pain, it is important to perform a good physical examination of the patient, since this will help us better understand the area that could be affected and causing said physical discomfort. (16)

PHYSICAL EXAM

You have to observe the patient's posture, gait, how their heels and toes look and see if they can perform spinal movements such as flexion. There are some signs that help determine if the patient has changes in the spine that cause pain. Among the most used we have (2):

- **Laségue test:** Also known as the straight leg raise test, it is the most used. It is performed with the patient on a stretcher, in a supine position, and the patient's leg is lifted. It must be extended, that is, it must rise straight; placing one hand on the iliac spine and the other on the heel. If the patient presents pain between 30 and 60°, this sign can be defined as positive, indicating that there is possible compression of the sciatic nerve in said leg. (17)

IMAGING DIAGNOSIS

It is not advisable to request imaging studies routinely in patients who present acute nonspecific pain or without warning signs. The patient may require these types of methods if the back pain appears to be the result of an injury, if the pain persists for a long period of time, or if there is any indication that there may be an underlying cause. requiring complex treatment. Since, if this were not the case, it could lead to unnecessary tests and interventions, in addition to increased costs for patients. (18)

Within the imaging methods that could help us clarify and determine any alteration or possible underlying pathology, or for those patients in whom a surgical intervention is already being considered or who presents warning signs; are:

- **Radiography:** This imaging method is the first line within the studies that can be used, in the event that the patient presents alarm signs, it is advisable to perform it Anteroposterior and lateral, standing and if possible barefoot, to obtain complete images. (19)

Since it shows us how the alignment of the bones is, that is, the vertebrae, it helps determine if there is the presence of some type of fracture, changes due to

aging or some type of deformity, that is, alterations in the curvature or shape of the vertebrae. X-rays do not show disorders of the muscles, ligaments, or discs and nerves. (19)

It is recommended to perform this type of diagnostic studies in patients with chronic low back pain that does not improve with the treatment already used, when severe or progressive neurological deficits are present, or in cases where there is suspicion of a specific disease based on the information that was obtained during the interrogation, that is, with the medical history. (twenty)

- **Computed tomography:** This study uses iodinated contrasts, it could be performed if there is suspicion of a specific disease, or if you want to perform surgery and want to use it as a preoperative assessment. Allows visualization of herniated discs and vertebral stenosis. Therefore, this exam must be requested when you want to observe the bone. (19)
- **Magnetic Resonance:** The characteristic of this study is that it has some advantages over Tomography, since the soft tissues, marrow, and contents of the medullary canal can be visualized in better quality; But performing repeated MRIs is not usually useful because their interpretation is usually difficult after the initial episode and also because they do not seem to present changes in the results. For this reason, this test is useful for the diagnosis of patients who are going through processes such as cancer, perhaps suspect metastasis, or who present some other warning sign. (18)

- **Electromyography:** It is indicated in the latter case, or if there is a neurological deficit, to rule out radiculopathy; therefore it is not recommended in acute processes. It measures electrical impulses produced by nerves in response to muscles, it can confirm nerve compression, either from a herniated disc or spinal stenosis. (twenty)
- **Laboratory tests:** In the event that there is a suspicion of an infection, biometry could be performed to find out if the parameters are altered and the patient is actually going through an infectious process, thus causing these discomforts in the patient or if presents warning signs. (18)

TREATMENT

A total of 90% of cases with these types of pain can be controlled by the primary care doctor, and 10% of patients require referral to a specialist at another level of care. Initial treatment is aimed at controlling low back pain and trying to maintain mobility function in the patient until the compression or inflammation decreases, depending on which case is affecting the patient. Therefore, the patient must continue with the doctor's instructions, and at the same time the doctor must be clear, in order to avoid possible complications that may affect daily life. Treatment consists of following general measures, and both pharmacological and non-pharmacological treatment. (twenty-one)

GENERAL MEASURES

- It is not recommended that the patient remain in absolute rest, that is, stay in bed all the time; On the contrary, it is better to stay active, as this helps reduce pain, as long as you carry out activities as much as the pain allows, avoiding sudden movements that could worsen your symptoms. In the event that the patient presents acute disabling pain, it is recommended that he remain at absolute rest for 2 or 3 days, no more, since muscle tone disorders could begin; Once this time has elapsed, then continue with relative rest until he can gradually return to the activities of daily living that he used to do before. (2)
- Physical activity is something that they could do and that would help improve symptoms and functional capacity in the short and long term, compared to those who do not do any activity. It is ideal to perform exercises such as aerobics, as it helps strengthen muscles, or another activity that helps is Pilates, walking, swimming; These could be done 2 to 3 times a week. Bringing benefits of shortening the days of disability in patients, especially with chronic pain. If these activities increase pain, they must be suspended. (19)
- Postural hygiene standards:

-Something that could help maintain good posture is sleeping on your back and if you cannot adopt this type of posture, you could try lying slightly on your side, not on the affected side.

-When getting out of bed, it is preferable that you turn and lean on your side, then support yourself with both arms to be able to sit up. In order to avoid standing up frontally.

-When sitting, it is recommended to rest your feet completely on the floor and keep your knees at the same level.

-Avoid incorrect postures, as this would lead to the symptoms being exacerbated, due to increased pressure on the intervertebral disc, which could also cause a fissure, herniated disc or protrusion at some point. It is recommended to avoid the lowest

possible weight load and sudden movements. (16)

- Changes in lifestyle, especially if the patient has a body mass index greater than 25; since this leads to an overload on the intervertebral disc, which would cause wear and probably a crack. Therefore, it is essential that you lose weight, since this intervenes in your pain, due to your high body mass, greater weight that your spine must support, for this reason it is recommended that the patient start a balanced diet, accompanied by exercises that are tolerated. (17)
- The use of girdles or corsets is currently not recommended, since there is not enough evidence on the effectiveness of these implements, because these have rather caused discomfort to the people who have used them, and have even caused loss of muscle tone. and dermatological alterations, especially when there is prolonged use. For this reason, if these girdles are used, they must only be used if the doctor recommends it, only for a short time and you have to know how to place them. They could be used when the patient wants to lift some weight, which is not recommended because lifting weight the pain worsens. (22)

NON-PHARMACOLOGICAL TREATMENT

- Massage therapy: In a systematic review that was carried out in 2012 in Brazil, it was concluded that massage helps non-specific low back pain, in addition to having long-term effects.
- term, at least one year after completing the treatment. A latest study carried out in 2020 on heavy-duty workers concludes that the massage protocol helps considerably to improve symptoms. (23)
- **Electrotherapy:** It consists of applying energy through a specific cannula that has a non-conductive plastic cover, except for its tip, and closing the circuit through a disperser plate. There are some, but the most used is thermal or conventional. A meta-analysis with randomized studies published in Spine Journal in 2017 concludes that this method is effective in the treatment of lumbosciatalgia.(24)
- **Heat therapy:** Or thermotherapy, it is a treatment in which heat is used to end lower back pain, even in chronic pain; There is no recommended temperature, as it depends on the patient's sensitivity. It is given through thermal wraps, it helps because the heat increases blood circulation and applying it for a long period of time makes the muscles relax and thus reduces the pain. In a prospective study, patients with acute low back pain were randomized to receive continuous low-level thermal wrap therapy for 8 hours a day, acetaminophen, and ibuprofen. All 3 groups showed improvement in pain, but heat therapy was significantly greater than paracetamol and ibuprofen. A 33% relief for thermal wrap compared to paracetamol and 52% for this therapy compared to ibuprofen. In addition to presenting a reduction in muscle rigidity and improvements in flexibility. (25)
- **Acupuncture:** This method presents a large number of clinical trials. There are several hypotheses about the mechanism of action of acupuncture and its pathophysiological role in the analgesic effect, none of which provide a complete explanation. (26)
- There is Melzack and Wall's gate theory described in 1969, which refers to the brain's inability to process more than one stimulus at the same time, whether painful or not. In such a way that at the moment of inserting the needles, this

stimulus in this case painless overshadows the painful one, this is conducted to the Rolando gelatinous substance of the dorsal horn of the spinal cord, exciting it and causing the transmission of the painful stimulus or closing the gate, is conducted by the A delta and C fibers that

- They are thin and slow, when they reach the dorsal horn it is blocked and does not transmit to the brain. (27)
- Acupuncture has also been shown to stimulate the release of endogenous opioids (endorphins) in the limbic, subcortical, and brainstem structures of the central nervous system. Additionally, needle insertion stimulates the release of corticotropin and cortisol in the pituitary gland. A 2019 study in Spain evaluated 74 patients, who at the end of the 2-week acupuncture that consisted of 8 sessions; Pain intensity control achieved positive results in 81.08% of patients, while 18.92% of patients did not have positive results. Acupuncture is an effective treatment for acute or chronic lumbosacral pain. In chronic mechanical low back pain, acupuncture showed beneficial results in short-term pain relief compared to placebo and was also associated with other traditional treatments. (28)

PHARMACOTHERAPY

In addition to non-pharmacological measures, medications are also often used to help alleviate this symptomatology, and with the review of articles and guides there are drugs that are considered the first line to treat these pains, as well as other drugs that, if they do not work the first step, could be used. The choice of treatment must be individualized, taking into account the characteristics of each patient and possible risk factors.

- **Analgesic:** According to data from the Low Back Pain Guide of Ecuador, paracetamol is considered, after carrying out some studies in which it is compared with NSAIDs, the medication that has the least repercussions on humans when it comes to using them. for having a better profile in terms of risk and benefit, and leaving good results. Used in doses of 500mg or 1g every 6 hours, without exceeding 14 days. This is of great help in patients with acute pain. It is recommended not to exceed the dose of 4 grams per day, as it could have consequences for the patient, such as systemic gastrointestinal or renal side effects. (twenty)
- **AINES:** These medications are recommended to be used as a second line for this type of pain, especially if the patient has chronic pain, since it has better effects than paracetamol in these cases; It is considered a second medication due to the possible adverse effects it could cause in the patient. The one that works best is ibuprofen in doses of 400 mg every 8 hours, without exceeding its use for more than two weeks. (16)
- Muscle relaxants, anticonvulsants and opioids: It is not suitable for those with mild or acute pain, there is no clear evidence to demonstrate the effectiveness of these medications and this is associated with a higher rate of adverse effects. Therefore, the use of analgesics, such as paracetamol, is recommended as the first line and as a second line, if this medication does not work, NSAIDs would be used. (29)

SURGICAL TREATMENT

This is the last measure for this type of pain, it is performed only in strictly necessary cases, it is not recommended in patients whose diagnosis is specific and acute; That is to say, it could be performed if you have a disease, whether it is going through an infectious process and this is the cause of the pain, neoplasia, herniated disc, or in chronic pain, which is causing motor disability, or which despite the pharmacological treatment has not decreased and has worsened. (30)

ADVANTAGES

- Reduction of postoperative pain in 75% of patients, if minimally invasive surgery is performed.

DISADVANTAGES

-Risk of infection or complication of surgery.

-Recovery is more complicated, more care, rehabilitation.

-The pain may not improve, or if it improves over a period of time, the pain may once again affect the patient's life.

Therefore, it can be considered that surgery brings more disadvantages than advantages since it cannot ensure that the patient will not have more lumbosciatic pain problems. (30)

CONCLUSION

Lumbosciatalgia is a pathology that is very prevalent in the general population; it is one of the most common reasons for consultation in primary health care; It is more common between 25 and 49 years of age, that is, it affects the working-age population, which is why it has a great impact not only in this area, but also socially and economically. It is in sixth place among the pathologies that cause the greatest burden of disease globally.

As for the diagnosis, this is based mainly on taking a correct anamnesis in order to learn more about the patient's history, everything that contributes to the pain, from when it started, to what exacerbates it and something that is also very important, Learn about what you do, what your job is. In addition to the physical examination, which ranges from observing the patient's position and gait to performing the test that is considered the one that best helps us detect this lumbosciatic alteration, such as the Laségue test, it is simple and very practical; Imaging tests would be the second option in the event that any alteration at the vertebral level or other pathology is suspected.

Regarding treatment, after having carried out the bibliographic review, the medication of choice that brings greater benefits than adverse effects is paracetamol and if it does not improve with this, NSAIDs could be used, as long as without prolonging its duration. use greater than 2 weeks. Also accompanied by non-pharmacological treatment such as massage therapy, thermotherapy or acupuncture, which bring good results in terms of pain improvement. Surgery remains the last treatment method, in the event that it is necessary, such as if the patient does not show improvement with the proposed treatment or if his or her symptoms or motor ability worsen.

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