

International Journal of Health Science

Acceptance date: 25/02/2025

MODERN APPROACHES TO THE TREATMENT OF HERNIATED DISC INJURIES

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Abstract: Introduction: Disc herniation is a prevalent condition that affects between 13% and 40% of the population throughout their lives, with a higher incidence between the ages of 50 and 60. It is one of the main causes of back pain and work incapacity in Brazil. The condition originates between the vertebral bodies, where the intervertebral disc plays a crucial role. The development of the hernia involves cracks in the fibrous ring, allowing the nucleus pulposus to protrude, which can affect the nerve roots. Factors such as genetic predisposition, aging, sedentary lifestyle and inappropriate habits contribute to its occurrence. Objective: This article aims to review current approaches to the treatment of lumbar disc herniation, emphasizing the effectiveness of conservative options and the importance of individualization in clinical management. Methodology: This study consists of a narrative literature review, with articles selected from the SciELO, PubMed, Google Scholar and UpToDate databases, covering publications from 2014 to 2024. The following descriptors were used for the search: “Herniated disc” AND “Lumbar spine” AND “Treatment” AND/OR “Conservative” AND “Minimally invasive surgery”. Results and Discussion: Treatment approaches begin with conservative measures, progressing to more invasive interventions such as surgery when necessary. Conservative treatments, including physiotherapy and medication, have proved effective in improving patients’ quality of life. In persistent cases, epidural injections and minimally invasive surgical procedures are considered. Conclusion: Lumbar disc herniation is a multifactorial condition that impacts quality of life. Conservative treatment should be the first line of intervention, with a combination of physiotherapy and postural education. Surgical intervention should be reserved for specific cases where there is evidence of nerve compression. The ideal approach should be individualized, taking into account the characteristics of each patient and the integration of a

multidisciplinary team in the treatment, with a view to using new technologies and prevention practices.

Keywords: Herniated disc; Lumbar spine; Treatment; Conservative; Minimally invasive surgery;

INTRODUCTION

Herniated discs are a common condition, affecting between 13% and 40% of the population throughout their lives, with a higher incidence between the ages of 50 and 60. Most cases occur especially at the L4/5 and L5/S1 levels, followed by the cervical and thoracic areas to a lesser extent. Although it can be asymptomatic, herniated discs are one of the main causes of back pain, affecting 13.5% of Brazilians and being the main reason for granting sick pay, as well as being the third leading cause of disability retirement in the country. The prevalence of this condition has increased, which can be attributed both to the greater sensitivity of imaging tests and to behavioral changes and the aging of the population (Nascimento & Costa, 2015).

A herniated intervertebral disc occurs between the vertebral bodies and plays a crucial role in the structure of the spine. This disc is made up of two main parts: the annulus fibrosus, which is made of fibrocartilaginous tissue and provides flexibility to the spine, and the nucleus pulposus, a gelatinous substance that acts as a shock absorber, absorbing the impacts that the spine faces. The development of the hernia begins with the formation of fissures in the fibrous ring, allowing the nucleus pulposus to protrude outwards, which can affect the nerve roots in different ways. This process can result in protrusions, where the disc bulges, or extrusions, when the annulus fibrosus ruptures and the nucleus extravasates into the spinal canal. The location of these alterations can occur in four areas of the disc: central, posterolateral, foraminal or extraforaminal, each causing different clinical manifestations. Posterolateral herniation tends to compress the nerve root,

while midline herniation can cause spinal cord compression and myelopathy (Sussela et al., 2017). Mechanical compression of the nerve and increased release of inflammatory mediators are key aspects in the pathophysiology of disc herniation. Nerve root lesions can result from both direct compression exerted by the hernia and irritation caused by inflammatory mediators released during the process (Pereira Levada et al., 2024).

Herniated discs are a multifactorial condition influenced by several factors, including genetic predisposition, aging of the intervertebral discs and a sedentary lifestyle. In addition, habits such as smoking, being overweight, adopting inappropriate postures when carrying objects and making inappropriate movements also play a significant role in its development (Sussela et al., 2017). The underlying causes of herniated discs include degenerative processes, trauma, connective tissue disorders and congenital conditions (Pereira Levada et al., 2024).

The lumbar region is the most affected by intervertebral disc herniation, often resulting in low back pain and sciatica (Sussela et al., 2017). In more severe cases, muscle weakness or sensory changes can occur. Diagnosis is usually made using magnetic resonance imaging, especially when symptoms persist for more than six weeks (Pereira Levada, L. et al., 2024).

Historically, in the 1970s, patients with early signs of lumbar disc herniation often underwent surgical interventions. However, in the 1980s, studies began to reveal favorable results in patients who underwent non-surgical treatments (Tricks E., 2015).

Currently, the predominant approach is conservative treatment, except in cases of progressive or severe neurological deficits. This therapeutic approach involves the use of analgesics for pain relief, which, when combined with physiotherapy and specific exercises, aim to reduce spinal movements that can irritate

or further compress the nerve roots. In cases of persistent neurological deficits, cauda equina syndrome, sensory deficits or intense and intractable nerve root pain, it is essential to consider invasive procedures (Moley P., 2022).

In this context, this article aims to review current approaches to the treatment of lumbar disc herniation, emphasizing the effectiveness of conservative options and the importance of individualization in clinical management.

METHODOLOGY

This study consisted of a narrative review of the literature, with the aim of synthesizing the most recent approaches applied to the prevention, diagnosis and treatment of lumbar conditions associated with herniated discs. The articles were selected from the SciELO, PubMed, Google Scholar and UpToDate databases, covering publications from 2014 to 2024. The following descriptors were used for the search: “Herniated disc” AND “Lumbar spine” AND “Treatment” AND/OR “Conservative” AND “Minimally invasive surgery”.

The inclusion criteria adopted were: (1) publications between 2014 and 2024; (2) studies available in English or Portuguese; (3) articles that directly addressed the proposed themes; (4) free access to the full text; and (5) inclusion of original articles, case-control studies, literature reviews, meta-analyses and cohort studies that investigated the association between lumbar disc herniation and its therapeutic strategies.

Studies with questionable methodology, informal literature reviews, paid-for articles, articles available only in abstract form, which did not directly address the proposed theme or which did not meet the previously established inclusion criteria were excluded. Initially, the titles and abstracts of the articles identified were analyzed to ensure their relevance according to the defined criteria, and ineligible studies were discarded.

This review prioritized a conservative approach as the first line of treatment, emphasizing physiotherapy and postural education practices. For cases in which symptoms persisted or were more severe, minimally invasive surgical interventions were considered, associated with the judicious use of analgesics and anti-inflammatory drugs.

RESULTS AND DISCUSSION

Currently, treatment approaches begin with conservative measures, progressing to more invasive interventions, such as surgery, when necessary to relieve nerve compression. The outcome of the disease depends on the severity of the hernia, the response to initial treatment and nerve involvement. It is important to note that, in many cases, herniated discs occur acutely and do not require specific treatment, as they can regress naturally within a few weeks (Castro Alves Filho, A., et al., 2024).

Imaging tests play an essential role in the evaluation of disc herniation, both in the initial diagnosis and in defining the therapeutic strategy, as highlighted by Amin R. et al. (2017). Plain radiographs are the first-line imaging modality used in low back pain, offering a static view of the spine. Magnetic resonance imaging (MRI) is considered the gold standard for confirming suspected disc herniation, with a diagnostic accuracy of 97% and high interobserver reliability. Although computed tomography (CT) is clinically inferior to MRI in detecting herniations, in certain situations, such as the unavailability of MRI or excessive patient discomfort, CT myelography may be a viable alternative.

Conservative treatments represent the main approach to managing herniated discs, aiming to improve patients' quality of life by restoring mobility and reducing pain. This integrative approach combines physical interventions, education about healthy habits and the use of medication (World Health Organization,

2023). Guidance on physical activities that do not aggravate symptoms is crucial, and multi-professional treatments are recommended for patients with persistent symptoms. Physiotherapy aims to strengthen the lumbar region and promote stability, while Pilates is effective in strengthening muscles that are little activated in daily activities (Mussi et al., 2023).

The use of non-steroidal analgesics is a short-term pharmacological treatment option, providing a good prognosis for acute cases. In addition, these drugs can be used in combination in the treatment of chronic cases, but should not be administered continuously in either situation. The use of opioids for pain relief should be cautious due to the high potential for addiction to these drugs, and they are not recommended as primary treatment (World Health Organization, 2023).

For patients who do not respond to conservative treatment and have symptoms for at least four to six weeks, translaminar epidural injections and selective nerve root blocks are second-line options. Although there is limited evidence on the efficacy of epidural injections beyond three months, repetitions are often considered (Massa, R. N. et al., 2023).

In the last 15 years, minimally invasive approaches such as percutaneous discectomy have been increasingly used, associated with less bone and soft tissue trauma, reduced acute care costs and shorter hospital stays (Amin, R. M. et al., 2017). Surgical procedures for a herniated disc include laminectomies with discectomies depending on the cervical or lumbar area. An artificial disc replacement option may be considered. Other alternative surgical procedures for the lumbar spine include a lateral or anterior approach requiring complete discectomy and fusion. The benefits of surgical intervention are moderate and tend to diminish over time after the procedure (Massa, R. N., et al., 2023).

When it comes to the choice of approach, conservative or pain-blocking attempts have been shown to be positive and effective in reducing symptoms of pain and decreasing strength, although when there is a lack of response to such approaches, surgical procedures are important indications (Silva et al., 2023). In addition, clinical manifestations alone, such as the volume of hernias, are not predictive factors for a surgical approach, which is reserved for patients who do not respond to non-invasive methods (Silva et al., 2023).

Recovery can vary, and some patients experience considerable improvement, while others may deal with residual symptoms such as muscle weakness and mild neurological deficits (Pereira Levada, L. et al., 2024). In addition, complications associated with herniated discs include lasting nerve damage in cases of severe compression. Although most discectomies are successful, some cases may require reintervention (Massa, R. N. et al., 2023).

Conservative approaches should therefore be reinforced as treatments of first choice. In unique cases, this should be combined with minimally invasive methods, such as pain blockade used as a second-line treatment, which can show a good improvement in symptoms. However, surgical procedures should be reserved for specific cases that don't progress as expected and don't respond to non-invasive methods (Silva et al., 2023).

CONCLUSION

Lumbar disc herniation is a prevalent and multifactorial condition that directly impacts on patients' quality of life and represents a major challenge for public health, being one of the main causes of back pain and work incapacity in Brazil. The review presented highlighted the importance of the evolution of therapeutic approaches to herniated discs, which has resulted in a better understanding of the importance of conservative treatment

as the first line of intervention. Conservative treatment is read as a combination of physiotherapy, specific exercises (such as Pilates), postural re-education and the judicious use of analgesics to relieve symptoms and improve the patient's functionality.

Of course, when the conservative approach doesn't prove effective or when there is a progressive and significant neurological deficit, more invasive interventions should be administered, such as pain blocks and surgical procedures. These include minimally invasive procedures such as percutaneous discectomy, which offer less tissue trauma, faster recovery and lower costs. It should be noted that surgery should be reserved for specific cases where there is evidence of nerve compression or severe syndromes such as cauda equina syndrome.

Clearly, the ideal treatment should be based on the specific and individual case of each patient, taking into account their symptoms, tests, response to initial treatment and specific characteristics, such as the presence of comorbidities. Furthermore, the importance of integrating a multidisciplinary team in the treatment of herniated discs should be emphasized, with the presence of doctors, physiotherapists and other health professionals. These professionals must rely on the incorporation of new technologies in the diagnosis and therapeutic approach, with high-precision imaging exams and minimally invasive procedures to contribute to the recovery of these patients.

In short, the treatment of herniated discs, given the individuality of each patient, should be multidisciplinary and prioritize conservative and non-invasive approaches initially, reserving surgical interventions for more complex cases. Finally, the promotion of a healthier lifestyle and education about proper postural habits are also essential and serve as allies not only for treatment, but also for the prevention of recurrences.

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