

Conservative versus surgical treatment in patients with lumbar disc herniation

Tratamento conservador versus cirúrgico em pacientes com hérnia de disco lombar

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ABSTRACT

BACKGROUND AND OBJECTIVES: Herniated disc is a common pathology, affecting about 5 to 10 cases per 1000 adults annually. A conservative or a surgical approach to treatment can be adopted. The present study's objective was to evaluate each of these approaches.

CONTENTS: An integrative literature review was carried out, aiming to understand which treatment provides greater benefits in the short, medium, and long term for patients with low back disc herniation. Of the 4941 articles found, 4852 were excluded by title, 75 by abstract and 14 were selected for the study. Of these 14 studies, 10 considered the conservative approach more beneficial to patients, while 4 considered the surgical conduct more beneficial.

CONCLUSION: Surgical treatment is a good option for those cases in which patients have debilitating pain and need rapid pain relief. However, in the long run, there is no superiority of surgery over conservative treatment.

Keywords: Intervertebral disc displacement, Low back pain, Surgical procedures.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A hérnia de disco é frequente na população, com cerca de 5 a 10 casos anualmente em cada 1.000 adultos. O tratamento pode ser feito de modo conservador ou cirúrgico. O objetivo deste estudo foi avaliar cada uma destas técnicas.

CONTEÚDO: Realizou-se uma revisão integrativa de literatura, objetivando elucidar qual tratamento proporciona maiores benefícios a curto, médio e longo prazo para os pacientes com hérnia de disco lombar. Dos 4.941 artigos encontrados, 4.852 foram excluídos pelo título, 75 pelo resumo e 14 foram selecionados para o estudo. Dos 14 estudos analisados, 10 consideraram a conduta

conservadora como mais benéfica aos pacientes e 4 consideraram a conduta cirúrgica mais benéfica.

CONCLUSÃO: O tratamento cirúrgico é uma boa opção para os casos em que os pacientes apresentam dores debilitantes e que necessitam de alívio rápido da dor. Entretanto, a longo prazo, não há superioridade da cirurgia em relação ao tratamento conservador.

Descritores: Deslocamento do disco intervertebral, Dor lombar, Procedimentos cirúrgicos.

INTRODUCTION

Low back pain, or lumbago, and low back pain radiating to the lower limbs, or lumbosciatalgia, are common complaints in medical care. About 85% of cases involve low back disc herniation¹, with an incidence of 5 to 20 cases in every 1000 adults², being more common in people in the third to fifth decade of life, with a proportion twice as high in the male gender².

The intervertebral disc is composed of the fibrous ring and the nucleus pulposus³. The fibrous ring rupture is more frequent in the posterior part, where the collagen bundles are less dense, resulting in the expulsion of the nucleus pulposus³. Clinically there is increased pain when sitting, coughing or sneezing, and relief on standing or walking. Radiation of pain to the lower extremity and neurological symptoms such as numbness, motor weakness, and urinary or fecal incontinence are signs of advanced disease with disc prolapse, nerve root compression, or spinal stenosis⁴.

The presence of disc protrusion doesn't necessarily mean that the patient will be symptomatic; in many cases it may be just an incidental finding on imaging exams². There may be spontaneous regression of the herniated material and consequent improvement of symptoms, so that in more than 85% of patients the symptoms caused by acute herniated disc will resolve in 8 to 12 weeks, with no specific treatment².

Considering the possibility of conservative or surgical management, there are doubts as to which is the best for these patients in the short, medium and long term.

The objective of this study was to compare these two approaches to the available evidence in the literature.

CONTENTS

In order to perform the integrative review, first the problem was identified, then a literature search was performed, with delimitation of descriptors, databases and inclusion and exclusion criteria. Following that, the data obtained was evaluated and analyzed and the final text was composed.

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The studies search occurred in September and October 2020, using the keywords: Conservative Treatment, Surgical procedures, Nucleus Pulposus, and intervertebral disc displacement. Free terms do not present in DeCS were also used.

Studies in Portuguese, English, and Spanish published in the last five years that compared surgical and conservative treatment for lumbar disc herniation were included. Articles that included patients with radicular symptoms of diseases other than lumbar disc herniation, that included children or adolescents, and articles about cervical or thoracic disc herniation were excluded. A total of 4941 articles were found in the Scielo, Pubmed, Cochrane, CAPES, LILACS, and Revista Science platforms. Of those, 4852 were excluded by title, 76 by abstract, and only 14 were selected for meeting the inclusion criteria. Two authors acting independently examined the titles and abstracts of the articles obtained through the electronic search. The third author did a full reading of the final text.

The data were not pooled due to the heterogeneity of the methodology used in each article. Figure 1 presents the summary of the article selection process.

RESULTS

Table 1 shows the authors, surgical treatment, conservative treatment, and the main conclusions of each study.

A cohort study⁵ that retrospectively analyzed 277.941 symptomatic patients diagnosed with low back disc herniation found that 97% of them obtained success with conservative treatment and only 3% underwent surgery. According to the study, independent predictors of conservative treatment failure were male gender and previous opioid use. The study concluded that the best option for initial treatment is conservative treatment, since a high percentage of patients recover or experience gradual or substantial improvement within 4-6 weeks of treatment^{1,7,8}.

When comparing short-, medium-, and long-term outcomes, a systematic review published in 2019 found that surgery provides significantly greater short- and medium-term pain reduction, but this difference did not persist on the long term⁹. A cohort study with 370 patients showed that surgical treatment decreased lower back pain by 6 weeks more than

conservative treatment; however, after 3 months, no relevant clinical difference was observed between the groups¹⁰. Another systematic review, with a sample of 2271 patients, came to the same conclusion, because within 1 to 3 months and 3 to 6 months, pain assessed by the visual analog scale (VAS) showed better results in patients who underwent surgery, but in the long term the results were similar¹¹.

Another study that assessed pain using the VAS, including 128 patients, 64 in the surgical group and 64 in the non-surgical group, concluded that at the end of the 6 months follow-up the patients who underwent surgery had a lower VAS score, which decreased from 7.7 at the beginning to 2.8 at the end of the study, compared to patients who received clinical treatment, whose pain decreased from 8 to 5.5¹². A meta-analysis¹³ that evaluated surgery with simple discectomy and discectomy with bone-anchored device versus continued conservative treatment, presented evidence that surgery is more effective for symptom relief than persisting with continued conservative treatment in cases where the patient is refractory to initial conservative treatment¹³.

The evaluation of the success or failure of disc protrusion treatment by the quantitative sensory test (QST), which uses different stimuli to evaluate the perception of temperature and pain, found no differences in all parameters evaluated at the 3 to 6 months follow-ups in patients treated conservatively with steroid injections or with surgical treatment¹⁴.

One of the studies compared total disc replacement surgery in 69 patients. In 57 patients who were treated conservatively there was no difference between surgery and conservative treatment at the 8-year follow-up, supporting the theory that the possible development of adjacent intervertebral disc degeneration is part of the natural course of disc degeneration, regardless of the treatment that was instituted¹⁵.

Surgery provided better results by decompressing the affected nerve root when the outcome analyzed was the improvement of neuropathic pain. A study¹⁶ that evaluated neuropathic pain using the Leeds Assessment of Neuropathic Symptoms and Signs (S-LANSS) score found that the mean preoperative S-LANSS decreased from 11.4 to 7.5 one month after surgery, but a similar reduction was not observed in the group submitted to conservative treatment.

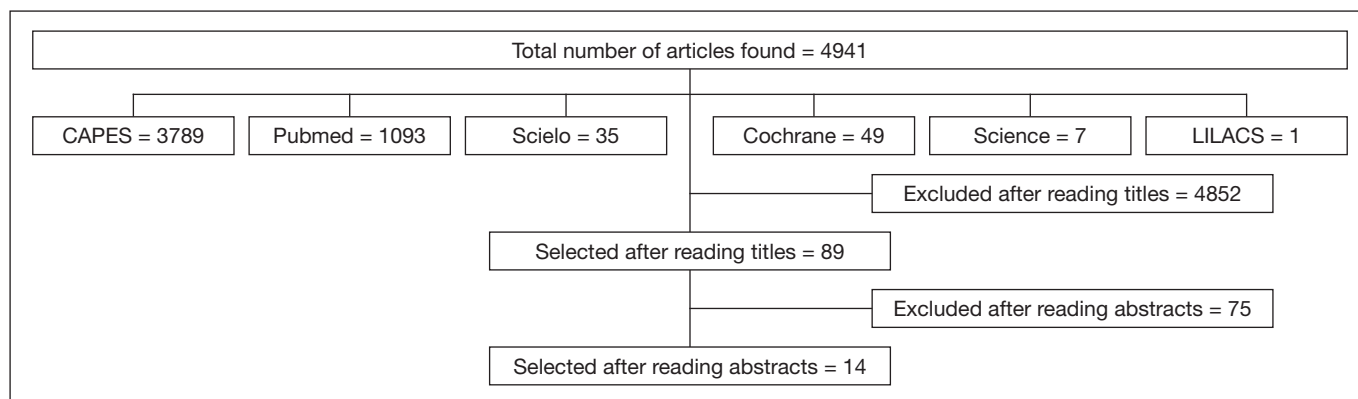


Figure 1. Study selection

Table 1. Articles analyzed, type of treatment and the main conclusions of each study

Authors	Types of study	Conservative treatment	Surgical treatment	Main conclusions
Lilly et al. ⁵	Retrospective cohort	NSAIDs; opioids, muscle relaxants, steroid injections, physical therapy and occupational therapy sessions, and chiropractic treatment.	Microdiscectomy	Of a total of 277941 patients evaluated in the study, 97% were successful with conservative treatment and only 3% were submitted to surgery.
Gugliotta et al. ⁹	Prospective cohort study	Ergonomic instruction, active physical therapy, counseling with instructions for home exercises, NSAIDs, opioids, epidural opioid infiltrations, and CT-guided pulsed radiofrequency of the affected nerve root.	Standard open discectomy	370 patients participated in the study, 297 received surgical treatment, 73 received conservative treatment. Patients submitted to surgical treatment reported less back pain at 6 weeks than those of conservative therapy. However, this difference decreased over time and after 12 weeks no relevant clinical difference was observed.
Koksal and Koc ¹⁵	Prospective case control	NSAIDs; corticosteroids; analgesics; opioids; gabapentin; pregabalin and intravenous steroids.	Intertransverse transmuscular microsurgery	83 patients were monitored, 37 of whom underwent surgery and 46 underwent conservative treatment. If surgical treatment for foraminal / extraforaminal low back disc herniation is delayed, the risk of persistent neuropathic pain (NP) may increase. NP can be prevented by sufficient decompression of the dorsal root ganglion.
Arts et al. ¹²	Systematic review and meta-analysis	Non-surgical multimodal treatments, physical therapy, spinal manipulation, and epidural steroid injections.	Low back discectomy with bone anchored annular closure and low back discectomy	Surgical treatment (low back discectomy and low back discectomy with bone anchored annular closure) is more effective than continuous conservative treatment for low back disc herniation. Low back discectomy with bone anchored annular closure > low back discectomy > conservative treatment. Surgical treatment was more effective in reducing leg pain, back pain and disability (herniated disc symptoms).
Bailey et al. ¹¹	Prospective cohort	Patient education, activities and exercises, use of oral analgesics and active physical therapy, as well as epidural injection of glucocorticoids.	Microdiscectomy	Out of a total of 128 patients, 64 underwent conservative treatment and 64 surgical treatments. At the beginning of the study, the leg pain intensity score was 7.7 in the surgery group and 8 in the non-surgery group. At 6 months, the score for pain intensity was 2.8 in the surgery group and 5.2 in the non-surgery group
Delgado-López et al. ¹	Literature review			The recommended initial treatment is generally conservative since a high percentage of patients recover or experience gradual and substantial pain improvement within 4-6 weeks. Both people who undergo surgery and those who are not submitted to it experience similar levels of pain after one year.
Chen et al. ¹⁰	Systematic review with systematic reviews and meta-analyses of randomized clinical trials	Physical therapy, pharmacological therapy, and rest		Clinical data suggest that surgery is more effective in improving physical function and quality of life than non-operative treatment. For patients with low back disc herniation, there is evidence that surgical treatment is more effective than conservative treatments in reducing short- and medium-term pain, short-term quality of life, and medium- and long-term disability.
Altun and Yüksel ⁶	Retrospective cohort	NSAIDs, muscle relaxants and opioids	Discectomy	23 patients were monitored in this cohort study and all presented improvement with conservative treatment over a 13.6 month period. The surgical approach provides faster symptomatic relief compared to conservative treatment. However, the results are similar for conservative and surgical treatment after 2 years.
Furunes et al. ¹⁴	Randomized case-control study	A modern multidisciplinary rehabilitation with cognitive approach and supervised exercise for three to five weeks.	Total low back disc replacement (TDR)	Adjacent disc degeneration increased in 40% of patients treated non-surgically and in 42% of patients treated surgically (p=0.86).

Continue...

Table 1. Articles analyzed, type of treatment and the main conclusions of each study – continued

Authors	Types of study	Conservative treatment	Surgical treatment	Main conclusions
Sussela et al. ⁷	Literature review			The first choice for symptomatic herniated disc scenarios are the non-surgical options, in view of the generally benign natural history of this disease, since in 60-90% of cases spontaneous resolution of symptoms occurs within the first 6-12 weeks. Absolute indications for surgical treatment are <i>cauda equina</i> syndrome or significant paresis. Relative indications are sciatic pain that has not responded to conservative treatment for at least six weeks and motor deficit greater than grade 3, or radicular pain associated with foraminal bone stenosis.
Clark, Weber and Kahwati ⁸	Systematic review	Physical therapy, pharmacological treatment, spinal manipulation, chiropractic treatment or a combination of these.	Discectomy, laminectomy, laminotomy, foraminotomy, nucleotomy, and nucleoplasty including micro- and minimally invasive approaches.	Surgery reduced leg pain by 6-20 points on a zero to 100 point pain scale at up to 26 weeks of follow-up. Differences between groups did not persist at 1 year or later. Minimal differences were observed at 2 years. Compared with nonsurgical interventions, surgery probably reduces pain and improves function in the short to medium term, but the difference does not persist in the medium to long term.
Garcia-Saiz et al. ¹³	Prospective cohort	Epidural injection	Simple discectomy	74 patients participated in the study: 50 underwent conservative treatment and 24 surgical treatments. After one month of follow-up, the patients submitted to surgery had better results on the QST than the patients submitted to steroid injection, this difference disappeared after 6 months of follow-up, when no statistically significant differences were found in any parameter measured by the QST.
Abou-Elroos et al. ²⁰	Randomized controlled trial	Physical therapy and rehabilitation (modification of activities); soft tissue massage; electrotherapy; static exercises for abdominal muscles, back muscles, and hip extensors; stretching exercises for the hamstrings, as well as range of motion (ROM) exercises; and pharmacological treatment with muscle relaxants, analgesics, anti-inflammatory drugs, pregabalin, and vitamin B complex.	Surgical discectomy	An extended physical therapy and rehabilitation program is beneficial and successful in patients with a recent diagnosis of low back disc herniation. This program can better improve functional capacity and facilitate the return to work compared to early surgical intervention. Other studies have reported that patients with low back disc prolapse who were treated surgically had better physical function and ability to work than those who were treated conservatively after 3 months; however, this difference was decreasing at the 2 years follow-up.
Petersen, Juhl and Fournier ¹⁷	Prospective cohort	Multidisciplinary team with rheumatologists, physical therapists, chiropractors, and a social worker. Treatment included a thorough examination, biopsychosocial approach on patient concerns, education on activities of daily living, individually adapted exercises, and manual therapy based on physical examination findings.	Not specified.	Approximately 30% of patients with low back disc herniation or low back spinal stenosis were unsuccessful at 2-year follow-up when they underwent surgery after unsuccessful conservative treatment. Surgical treatment was associated with better outcomes than cases in which surgery was not an option. Regarding patients with low back disc herniation, factors associated with failure to achieve a disability outcome were male gender, low schooling level, high pain intensity, and generalized pain location.

NSAIDs = nonsteroidal anti-inflammatory drugs. The studies^{5,6-9,11,13,14,17,20} report that conservative management is most beneficial to patients, while studies^{10,11,12,15} report that surgical management is most beneficial to patients.

DISCUSSION

Low back pain caused by herniated disc impacts several areas of an individual's life, especially between the 3rd and 5th decade of life², when they are in an active working phase. There are

reports of prodromal history of mild to moderate axial pain for months, followed by an acute episode of pain radiating to lower limbs, distinguishing lumbosciatalgia¹⁷. Knowing the treatment options and the right moment to indicate a certain therapy is essential to improve quality of life of these patients

and to enable them to return to their work activities as soon as possible.

The evaluation of the success of therapy for lumbar disc herniation is heterogeneous because some articles^{10,11,13} used the pain scale, others^{9,10,11} applied quality of life questionnaires, such as the Short-Form Health Survey (SF-36), and disability level indexes, such as the Oswestry Disability Index, making it difficult to compare the results of the selected studies. In any case, it was clear that conservative treatment is the first option due to the benign nature of the disease and the high percentage of spontaneous regression of disc herniations^{1,7,8}. On the other hand, there are cases in which surgical intervention is the absolute indication, such as *cauda equina* syndrome or significant paresis, which should be immediately operated⁸.

The ideal moment to indicate surgery in non-urgent cases is still uncertain, but conservative treatment for at least 6 weeks is recommended⁷. There is also the possibility of assessing the predictors of failure in prolonged conservative treatment, thus indicating surgery earlier. A cohort study¹⁸ showed that male gender, low education, intense and generalized pain are predictors of conservative treatment failure.

When comparing surgical and conservative treatment using pain scales, it was evidenced that surgery presents better results in the short and medium term; however, in the long term, patients had the same results, regardless of the type of treatment used⁹⁻¹¹. This research is in agreement with classic studies that are emphatic in stating that after 1, 4 or 10 years of follow-up the comparative results between conservative and surgical treatment of herniated disc sciatalgia are statistically similar¹⁹.

Although MRI is an excellent method for diagnosing herniated disc, there is no indication for it to be used as a parameter of treatment failure or success, because most patients report symptom improvement long before any radiological improvement is seen²⁰.

The prolonged physical therapy and rehabilitation program is more beneficial and successful for patients with a recent diagnosis of low back disc herniation than early surgical intervention, because it improves the functional capacity and facilitates return to work²⁰.

CONCLUSION

Conservative treatment is the initial treatment recommended for all cases of disc herniation, because it provides an earlier return to work activities. Surgical treatment is a good option for those cases that present debilitating pain and need quick relief; nevertheless, in the long term, for a period of one year or more, surgery is not superior to conservative treatment. As with all treatment, the patient's expectations and wishes must be taken into account when choosing different approaches.

AUTHORS' CONTRIBUTIONS

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