

**METHODS FOR TREATMENT OF DEGENERATIVE LUMBAR SPINAL
STENOSIS (LITERATURE REVIEW)**

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ANNOTATION: The article presents a review and brief comparison of predominantly surgical methods of treatment of degenerative stenosis of the lumbar spinal canal based on foreign publications over the past 5 years. Also marked main current problems modern spinal neurosurgery.

Key words: stenosis vertebral channel, decompression, stabilization, treatment.

INTRODUCTION

Lumbar spinal stenosis is a condition caused by degenerative process at spine, characterized by narrowing of the spinal canal [15]. Degenerative stenosis vertebral channel has a prevalence in the general population of up to 11 % [23]. However with age frequency increases at some once — to 47 % [24]. Spinal stenosis is one of the most common causes of disability in elderly patients [40]. The cause of this disease is several simultaneous processes [9]:

- aging of intervertebral discs with a decrease in the content of water and proteoglycan in the pulp core, leading to decrease disc height and protrusion of the fibrous ring;
- increased load on faceted joints- you leads to their hypertrophy, appearance osteophytes and thickening of the yellow ligament.

Most often this disease manifests itself pain at lower parts backs, neurogenic claudication syndrome, or isolated radicular symptoms [15].

There are dozens of different methods for treating stenosis, to these are absent clear indications for the use of a particular treatment method.

AIM OF RESEARCH

The aim of this review was to examine the latest data on methods of treating spinal canal stenosis and the choice of indications for these methods

MATERIALS AND METHODS

The information was taken from foreign publications in the PubMed, Scopus, Web of Science databases. The study depth was 5 years. In our review, we used the following search terms to search for studies: key in words: "decompression", "laminectomy", "spinal fusion», "lumbar stenosis».

RESULTS AND DISCUSSION

Conservative methods

Conservative treatment includes the use of drug therapy, local administration of steroid-containing drugs, the use of physiotherapy, and wearing a lumbosacral corset.

Typically, patients seeking medical care and not having indications to emergency surgical procedures, begin to receive drug therapy. Drug therapy is prescribed at the initial stage of the disease in order to eliminate the main symptoms of the disease and makes it possible to the patient go to to stage restorative physiotherapy [7]. The most recommended drugs are non-steroidal anti-inflammatory drugs, anticonvulsants, prostaglandin E1 analogues, methylcobalamin, opioids, muscle relaxants [2, 22, 26].

Separate view medicinal therapy includes infiltration of the facet joints, epidural space and periradicular administration of drugs. These methods require the administration of anesthetics in combination with steroid drugs, or anesthetics alone [15].

Physiotherapy includes exercise therapy, magnetic therapy, high-frequency electrotherapy, etc. Transcutaneous methods electrical neurostimulation and acupuncture have not been adequately studied in robust clinical trials [28]. The optimal exercise combination, frequency, duration, and effectiveness are currently unclear. Some studies have shown that What any form rehabilitation may lead to decrease pain and regression neurological deficit [40]. Another important role of physiotherapy is its use after surgical treatment in the period from 6 weeks to 3 months. Proven her influence on long term improvement states patient [35]. In addition, it was found that patients who received physiotherapy in the preoperative period had a faster postoperative recovery [31].

The conducted studies have established that the use of temporary immobilization of the lumbar spine using a lumbosacral semi-rigid corset increases distance walking at syndrome of neurogenic intermittent claudication and reduces the intensity of pain syndrome [28].

Despite the encouraging results of conservative treatment, the presented data indicate that it is possible to achieve lasting clinical improvement only through the use of various types of surgical treatment [33, 49].

Surgical treatment

In patients with no effect from conservative treatment, in the presence of acute neurological deficit (dysfunction of the pelvic organs, paresis), surgical treatment is recommended [34].

The goal of surgical treatment is to reduce neurological deficit by decompressing compromised neural structures. Currently, there are no recommendations for the choice of

surgical treatment method [15]. Recommended choose way treatment taking into account the localization of stenosis, the number of stenotic levels, the presence of spinal deformity and instability [7]. All surgical treatment methods can be divided into decompressive and decompressive-stabilizing methods.

Decompressive operations

Laminectomy at real moment is considered the gold standard for surgical treatment of lumbar spinal stenosis [29].

They highlight three species laminectomy:

- total laminectomy - with this method fully is being removed arc vertebra together with the spinous process, the medial parts of the facet joints, All soft tissue compression components;
- subtotal laminectomy - in this case is being carried out decompression V such same volume, How And at total, but faceted joints remain intact;
- Unilateral hemilaminectomy involves performing a laminectomy on one side (usually on the side where the symptoms are more pronounced) [25].

Decompressive surgeries have been shown to reduce radicular pain syndrome [53] and low back pain [47].

Comparison of the effectiveness of decompression methods did not reveal a significant difference in treatment results [27].

Decompression and stabilization Operations Application various stabilizing systems, at most cases transpedicular, complements decompressive operation, eliminating the possibility of developing progressive instability in the operated segment of the spine as a result resections elements of the spine at in the process decompression nerve- but-vascular structures [25].

At present, there is no consensus on which method of treatment - decompression or decompression-stabilization - is more effective and at what kind cases necessary fulfill only decompression.

Aihara and etc. At his work by assessment the results of decompressive and decompressive-stabilizing operations revealed that after the former, there were shorter hospitalization periods and less blood loss [6].

In a meta-analysis, Ahmed et al. compared decompression and decompression with stabilization. The results of the study showed a higher effectiveness of decompression-stabilization operations [3]. Wang et al. noted that decompression alone is sufficient in case of stenosis combined with radiographic signs of grade 1–2 according to Meyerding [48].

Other studies have found no significant difference in treatment outcomes. at patients with stenosis vertebral channel How after decompression, So and after decompression with

stabilization [10, 17, 30, 52]. Currently, the WFNS (World Federation of Neurosurgical Societies) recommendations on the issue of stabilization state the following:

- patients with stenosis and no signs or symptoms of instability are recommended to undergo decompression only;
- in the presence of stenosis and stable spondylolisthesis, stabilization of the spine is not mandatory;
- in case of unstable spondylolisthesis, stabilizing surgery is recommended;
- stabilization surgery may also be required in case of bilateral facetectomy (more than 50% of the joint area) and in case of bilateral discectomy;
- in case of severe discogenic pain syndrome on background stenosis counts more it is advisable to use decompressive-stabilizing operations, although this opinion not entirely unanimous;
- there is no evidence linking facet joint involvement with instability [43].

These recommendations do not define indications for spinal stabilization taking into account the specific features sagittal balance. Although it has been proven that spinal balance (SB) indices correlate with quality of life. According to many authors, all patients with stenosis The lumbar spine needs to be filled with at research sagittal balance [21].

There are studies proving the influence of changes in sagittal balance parameters on improving the quality of life of patients [20, 29]. However, there is no evidence of the benefits of decompressive or decompression and stabilization surgery in the presence of sagittal imbalance [12].

To date, the issue of treating multilevel stenosis remains unresolved [15]:

- Is there a need to perform decompression? operation on all stenotic levels?
- Is it better to perform multilevel decompression with or without stabilization?

At comparison results treatments by decompression method on one or several levels at multi-level stenosis was revealed the best efficiency and smaller frequency complications after single-level laminectomy. Postoperative instability developed more frequently after multilevel decompression. Some patients required reoperation with spinal stabilization. Based on these data, it can be assumed that not all patients with multilevel stenosis require resort to surgery on several levels [1].

Park et al., when comparing single-level and multi-level decompression with spondylodesis for multi-level stenoses, concluded that there were no significant differences in the effectiveness of these methods [38]. In the case of comparing the effectiveness of treating multi-level stenoses in combination with degenerative spondylolisthesis using single- or multi-level stabilizing operation at in combination with multilevel decompression, no

significant differences were obtained, with the exception of more long-term operation and more volume of blood loss in the case of multilevel stabilization [46]. In contrast, in his meta-analysis, Yang and etc. showed the best results treatment in patients who underwent multilevel decompression and stabilization surgery compared with multilevel decompression and single-level stabilization [51].

Thus, multilevel surgery is associated with a large number of complications and should be used only in extreme cases. There are currently no clear criteria choice necessary levels decompression Minimally invasive methods decompression and stabilization Currently, there are 2 main methods of minimally invasive surgery for lumbar spinal stenosis: minimally invasive decompression and endoscopic methods.

Minimally invasive decompression (MID)

This type of surgery is based on decompression with minimal damage to the muscular system in the area of surgical performance. interventions by way application development of a system of tube expanders and microsurgical equipment.

The effectiveness of MID was noted in patients who underwent one- and two-level decompression [14, 32, 51]. When compared with open laminectomy, it was proven that this way calls smaller destabilization of the segment [8, 45]. Also was noted, What MID performed in patients with stenosis in combination with radiographic signs of spondylolisthesis of the 1st degree according to Meyerding is less likely to cause the development of iatrogenic instability than when performing open laminectomy [41]. Despite the presence of positive data MID, quality research insufficient, and the long-term benefits of this procedure are unknown.

Endoscopic decompression

The surgeon has several methods of endoscopic decompression (ED) at his disposal. ED has shown better results than traditional open decompression. In addition, cost-effectiveness has been proven. ED at connections With reduction quantities days of hospital stay [36].

There are 3 types of endoscopic decompression :

- transcutaneous endoscopic — most frequently used in clinical practice, characterized those, What is used endoscope with a working channel and an additional channel for continuous irrigation [4];
- biportal - this method of surgery uses 2 separate instruments—optical (with a channel for irrigation) and working [13, 16, 19].
- tubular endoscopic method - this technique is similar to microscopic decompression, But at quality method Endoscopic techniques are used for visualization.

Sclafani et al., when evaluating the effectiveness of stenosis treatment using endoscopic decompression, found that this method improves the condition of patients and reduces pain.

They also noted a high frequency of relapses within a year [42]. On the contrary, at similar research Wen and etc. revealed a low relapse rate [50].

In one meta-analysis comparing microscopic laminectomy And endoscopic decompression, established, What at ED in early postoperative period a lower intensity of back pain was noted, but no differences in the effectiveness of these methods were found [37].

When performing these techniques, in comparison with open methods of decompression, the volume of intraoperative blood loss and the volume of damage to soft tissues are reliably reduced [44]. The disadvantage of endoscopic surgery for spinal canal stenosis is the presence of high crooked learning ability, by compared to open decompression. In addition, it was noted that endoscopic surgery may be associated with greater radiation exposure and increased operative time [39, 44].

Thus, it can be concluded that endoscopic decompression methods are promising in view of their small traumaticity. But, to unfortunately, at the moment, no large-scale studies have been conducted that would allow us to draw a clear conclusion about their obvious advantages over open methods of decompressive surgery.

CONCLUSIONS

Choice of treatment method for patients with stenosis vertebral channel at lumbar department remains a complex and controversial issue. This is probably due, firstly, to the lack of high-quality randomized studies; secondly, to the constant development of technical progress with the creation of new methods treatments at neurosurgery degenerative diseases requires constant revision of existing recommendations. Questions regarding the effectiveness of treatment selection methods still require further study, despite the frequent occurrence this pathologies.

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