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Differentiated Surgical Treatment of the Failed Back Surgery Syndrome in the Lumbar Spine Osteochondrosis

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Abstract **The aim -** of the study is to improve the results of surgical treatment of failed back surgery syndrome (FBSS) lumbar osteochondrosis by perfecting diagnostic methods and differentiated surgical treatment. **Material and methods** - work is based on the analysis of examination data of 147 patients with operated spine syndrome. All patients underwent a complete clinical examination, were operated on for compression of the neurovascular formations of the spinal canal. were divided into two groups: the main (87 patients who were examined and received differentiated surgical treatment according to the proposed algorithm) and the control (60 patients who were examined and treated by the traditional **Results**: All 147 patients with operated spine syndrome were operated on the lumbar level. All surgical interventions were performed from the posterior access. Interlaminar removal of true relapses of intervertebral disc hernias and hernias at adjacent levels was performed in 80 patients. **Conclusions**: the results of surgical treatment of patients with operated spine syndrome in the near and distant period are much better in the main group; the use of differentiated surgical treatment of FBSS based on our proposed algorithm has improved the results of surgical treatment.

Keywords Failed back surgery syndrome, Disc hernia relapse, Instability, Spinal canal stenosis, Decompression, Decompression-stabilizing operation

The frequency of unsuccessful results of surgery with the recurrence of radicular pain led to the appearance of the term "failed back surgery syndrome" or "operated disc disease" [2] [5]. The most common causes of this syndrome are relapse of hernias at the same or adjacent level, insufficient decompression of the lateral access during surgery, epiduritis, arachnoiditis, epidural fibrosis, discitis, segmental instability, lumbar stenosis and the other more rare causes [4]. Despite the accurate topical diagnosis of complicated forms of lumbar osteochondrosis using modern methods of neuroimaging, the use of various methods of surgical interventions, including microsurgical, endoscopic and others, there is a relapse of the pain syndrome in 15-50% of all operated [1]. Failed back surgery syndrome (FBSS) is a condition characterized by postoperative pain in the lower back and (or) leg with a varying degree of functional insufficiency, which reduces the patient's quality of life and labor activity [3]. Currently, indications for surgical or conservative treatment of patients with operated spine syndrome have not been fully developed, and the immediate and long-term results of their treatment have not been traced.

The aim of the study is to improve the results of surgical treatment of the operated spine syndrome in lumbar osteochondrosis by improving diagnostic methods and differentiated surgical treatment.

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1. Material and Methods

The work is based on the analysis of examination data of 147 patients with failed back surgery syndrome (primarily operated on for the reason of the lumbar intervertebral discs hernia removing) who were treated at the Republican Specialized Scientific and Practical Medical Center of Neurosurgery for the period from 2009 to 2018yy. All patients underwent a complete clinical examination (general somatic, neurological, radiological, neurophysiological, computed tomography and magnetic resonance imaging), were operated on for compression of the neurovascular formations of the spinal canal.

Patients were distributed by sex as follows: there were 83 men (56.5%) of the total number of patients and 64 women (43.5%). By age, patients from 20 to 66 years old met. The average age of patients was 45.0 ± 0.54 years.

We found the main reasons for the resumption of pain in the examined group of patients: relapse of a herniated disc at the same level or on the opposite side - 58 (39.4%), of which relapses on the opposite side - 14 (9.5%); relapse of a hernia of the intervertebral disc adjacent to the previously operated - 17 (11.5%); epidural fibrosis in the primary surgery area - 4 (2.7%); surgeon's fault (residual fragment, level error) - 7

(4.7%); spinal stenosis - 31 (21%); segmental instability - 28 (19%); pseudomeningoradiculocele - 2 (1.7%).

Patients were divided into two groups: the main and control. The first (main) group consisted of 87 patients who were treated from 2012 to 2018, who were examined and received differentiated surgical treatment according to the proposed algorithm. The second (control) group consisted of 60 patients who were treated from 2009 to 2011, who were examined and treated by the traditional method. Patients are divided into the main and control groups in order to compare the proposed diagnostic algorithm and differentiated surgical treatment. Patients in both groups were compared by gender and age. To assess the intensity and dynamics of the regression of pain before and after treatment, the Visual Analogue Scale (VAS) was used. This scale is the simplest scale for assessing pain, according to which the patient estimates his pain from 0 (no pain) to 10 (unbearable pain).

To assess the severity of clinical manifestations, we used a modified assessment scale of surgical treatment, Japanese Orthopedic Association (JOA).

2. Results

The purpose of surgical intervention in the failed back surgery syndrome is to achieve adequate decompression of the neurovascular formations of the spinal canal with maximum preservation of the supporting structures of the spine and to ensure reliable stabilization of the spinal motive segment. The complete elimination of the causes of compression of neurovascular formations in the spinal canal is pathogenetic in the treatment of compression forms of lumbar osteochondrosis. The presented requirements are most met by the access to the disk and articular processes from the posterior access with the elimination of all compressing factors, which cannot be achieved from the anterolateral access.

The patients with FBSS observed by us had absolute and relative indications for surgical treatment. Absolute is acute developing caudosyndrome; gradually developing caudasyndrome; the presence of compression of the neurovascular formations of the spinal canal with the precursors of myeloradiculoischemia or myeloradiculoischemia; the appearance against the background of radicular pelvic disorders.

All 147 patients with lumbar operated spine syndrome were operated on. All surgical interventions were performed from the posterior access.

Interlaminar removal of true relapses of intervertebral discs hernias and hernias of discs at non-adjacent levels was performed in 80 (54.4%) patients. In this group of patients, the main factor of compression was a herniated disc. In all 58 (39.4%) cases of true recurrence of a herniated disc in the area of repeated surgery, scar adhesions were found, in some degree.

Decompressive laminectomy was performed in 3 (2.0%) patients in the treatment of mainly the control group of patients. Decompressive laminectomy with transpedicular fixation was performed in 21 (14.3) patients. Indications for performing decompressive laminectomy and transpedicular stabilization were the presence of absolute lumbar stenosis in the patient and signs of instability of the vertebral-motor segment.

Decompressive laminotomy was mainly performed in 38 (25.8%) patients with relative stenosis of the spinal canal and with instability of the vertebral-motor segment. Decompressive laminotomy without stabilization was performed in 8 patients. The indication for performing decompression laminotomy was the presence of relative spinal stenosis in the patient. 5 patients with relative central lumbar stenosis underwent bilateral decompressive laminotomy and 3 patients with lateral stenosis underwent unilateral decompressive laminotomy. Decompressive laminotomy with fixation of the vertebral motor segment was performed in 30 patients, of which 15 patients underwent TPF and 15 patients the TPF with posterior interbody fusion cage. Menigoradiculolysis was performed in 3 (2%) patients with epidural fibrosis. In this group of patients intraoperatively was revealed that the compression factor was fibrous tissue and scar adhesions.

Removal of pseudomeningocoradiculocele and decompression of the spinal root was performed in 2 patients. At the same time, the source of the cerebrospinal fluid expiration was revealed and was sutured hermetically.

Assessment of the results of surgical treatment of patients with FBSS was performed in all 147 patients according to regression of neurological deficit and according to international scales (VAS and JOA score). The results of surgical treatment were evaluated at the time of release (7-10 days after surgery), 3-6 months after surgery and 12-24 months after surgery in 147 patients. However, the percentage of recovery of neurological deficit is significantly higher in the main group compared to the control. So, back pain regressed in 63 patients from 74 of the main and 44 from 55 of the control group, and only 8 (9.2%) patients of the main group and 12 (20%) of the control group bothered residual radicular pain. In 5 (5.7%) patients of the main and in 8 (13.3%) patients of the control, motor disorders persisted in the form of deep paresis. Sensitivity disorders regressed in 49 patients from 58 of the main group and in 52 of the remaining 65 patients in the control group; they persisted as light disorders with a tendency to recovery. Dysfunction of the pelvic organs of varying severity persisted in 5 (5.3%) patients of the main and in 5 (8.3%) of control groups. Regression of neurological symptoms in both groups within 3-6 months after surgery was better than at discharge. This confirms the view that the restoration of neurological deficit is achieved within 3-6 months. However, it should be noted that the restoration of neurological deficit in the main group and in the near and intermediate period was better in the main group. Residual effects in the form of pain, motor and sensory disturbances, as well as sensitivity disorders and reflexes remained at rather high numbers in the control group.

The recovery index was determined by the following formula: (after operated score — before operated score) / (15 - before operated score) x 100. The result was considered good with a recovery index of more than 75%, with an index of 50 to 74% it was considered satisfactory, from 25% to 49% relatively satisfactory, below 25% unsatisfactory.

Analysis of the results of surgical treatment of FBSS showed that the dynamics of regression of neurological deficit in the postoperative period in both groups lasts up to 3-6 months. A comparative analysis of the results of surgical treatment after 3-6 months and 12-24 months showed that there is no significant difference between them. A good discharge result was observed in 53 (60.9%) patients of the main group and in 27 (45.0%) of the control group, a satisfactory result in 17 (14.9%) patients of the main group and 13 (14.9%) patients of the control group, a relatively satisfactory result in 13 (14.9%) of the main and 24 (23.3%) of the control group, unsatisfactory in 4 (4.6%) patients of the main and 6 (10%) of the control group. After 3-6 months, a good and satisfactory result of surgical treatment was observed in 61 (70.1%) and 17 (19.5%) patients of the main group, as well as in 30 (50%) and 14 (23.3%) patients of the second group. In the long term, good and satisfactory results did not significantly differ from the indicators of the intermediate period. An unsatisfactory result of surgical treatment was noted at release in 4 (4.6%) patients of the main group and in 6 (10%) of the control group. After 3-6 months, this indicator decreased to 1.2% in patients of the main group and 6.7% in patients of the control group, and after 12-24 months this indicator in the main group remained unchanged (1.2%), and in control decreased to 6.7%.

3. Conclusions

1. The results of surgical treatment of patients with the FBSS in the near and distant period are much better in the main group than in the control group.
2. The use of differentiated surgical treatment of FBSS based on our proposed algorithm has improved the results of surgical treatment.

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