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Cost-Effectiveness of an Integrated Approach in the Treatment of Intervertebral Hernias

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Abstract This study addresses the increasing incidence of intervertebral hernias and explores optimal treatment approaches aimed at pain reduction, hernia size decrease, and recurrence prevention. A comprehensive therapy, combining standard treatment, the Dochim technique, and hirudotherapy, was tested on 153 patients divided into three groups. The results showed that the integrated approach significantly reduced pain by 93.9%, decreased hernia size, and lowered recurrence rates by 47%. The economic analysis confirmed cost-effectiveness, highlighting the potential of combined therapy in clinical practice to improve patient outcomes and reduce healthcare costs.

Keywords Hirudotherapy, Acupuncture, Intervertebral hernia, Standard treatment, Pain

1. Introduction

In the last decade, there has been a steady increase in the incidence of spinal diseases, in particular, intervertebral hernias, which requires the search for more effective methods of their treatment and prevention of recurrence [1,2,5,7]. In this context, the aim of the study was to identify the optimal approach to the treatment of intervertebral hernias with an emphasis on reducing pain, reducing the size of the hernia and preventing recurrence of the disease. For this purpose, a comprehensive therapy was developed and carried out, including standard treatment, the Dohim technique, as well as hirudotherapy. The study involved three groups of patients, each of whom received a different combination of methods. The results showed that an integrated approach to the treatment of intervertebral hernia is the most effective for improving the condition of patients, reducing the recurrence rate and significantly improving the quality of life. The introduction of complex methods into clinical practice has also demonstrated cost-effectiveness, which confirms the importance of further introducing such treatment methods into medicine [3,4,9].

The relevance of this article is due to the high prevalence of spinal diseases, in particular intervertebral hernias, which are one of the main causes of pain and disability among the adult population. In conditions of increasing morbidity and increasing burden on the healthcare system, the search for effective treatment methods is becoming an important task. Modern therapies often do not provide complete relief from pain, and may also be associated with a high risk of relapses and a long recovery period [6,8].

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In recent years, new approaches have been emerging that combine traditional treatment methods with innovative techniques such as Dochim and hirudotherapy. However, their effectiveness in comparison with standard therapy requires additional clinical studies. Comprehensive treatment of intervertebral hernias, which includes several therapies, can reduce the recurrence rate, improve the quality of life of patients and reduce treatment costs, which is an urgent topic in conditions of limited healthcare resources [1].

Thus, the study of the effectiveness of combined methods of treatment of intervertebral hernias and their effect on pain reduction, hernia size and recurrence prevention not only contributes to the improvement of medical practice, but is also important from the point of view of economic efficiency and improving the quality of life of patients.

The purpose of the study: The purpose of this study is to evaluate the effectiveness of various methods of treatment of intervertebral hernias, including standard therapy, post-surgery and hirudotherapy, as well as to determine the optimal approach to complex treatment to reduce pain, reduce the size of the hernia and prevent recurrence of the disease.

2. Research Materials and Methods

The study involved 153 patients with a diagnosis of intervertebral hernia, who were divided into three groups. All patients underwent a thorough clinical and instrumental examination, including magnetic resonance imaging (MRI) or multispiral computed tomography (MSCT) to confirm the diagnosis and assess the size of the hernia.

Group 1 (standard treatment): Patients in this group received exclusively standard therapy for intervertebral herniation, which included medication (painkillers, anti-inflammatory drugs) and physiotherapy.

Group 2 (standard treatment + Dochim method): Patients of the second group, in addition to the standard treatment, underwent additional therapy using the Dochim method. The procedure was performed twice a week between 8 a.m. and 10 a.m., by the author without assistance. The patients were in comfortable conditions, lying on their stomach without clothes, with a needle insertion point corresponding to the hernia level, according to the MSCT data. The injection site was treated with alcohol, anesthesia with 1% lidocaine was performed, and special needles were used to perform an acupotomy to a depth of 50-60 mm with the needle moving up, down, forward and backward. After the procedure, a negative pressure jar was applied to the needle insertion site to remove accumulated blood.

Group 3 (standard treatment + Dochim technique + hirudotherapy): The patients of the third group received combination therapy, including standard treatment, Dochim and hirudotherapy. Hirudotherapy was performed using medical leeches in the amount of 3-5 pieces per session, depending on the patient's weight. Hirudotherapy sessions were conducted on days that did not coincide with the sessions of the Dohim technique, in order to avoid the risk of uncontrolled bleeding. The course of hirudotherapy was 5-7 sessions.

Evaluation of results: The effectiveness of treatment was assessed by several parameters:

1. Pain syndrome: The Borg scale was used to assess the intensity of pain. The decrease in pain in each group was recorded as a percentage decrease in scores on the scale.
2. The size of the intervertebral hernia: Measurements of the size of the hernia were performed before and after treatment using MSCT or MRI. The change in hernia size was defined as the difference between the data before and after treatment.
3. Recurrence rate: Registration of cases of recurrence of the disease 6 months after the end of treatment to assess the long-term effect.

Statistical analysis: Standard statistical methods were used to analyze the data, including a description of the average value, standard deviation, and statistical criteria for comparing groups (t-test, $p < 0.05$ was considered statistically significant).

3. Research Results

Research was conducted to find the most optimal and effective method of treating spinal herniation. 3 research groups were formed. The first group of patients received exclusively standard therapy for intervertebral herniation.

The treatment regimen of the second group looked like this: standard therapy + dochim technique. The author carried out the method of cleaning 2 times a week from 8 to 10 o'clock in the afternoon, himself without outside help. The procedure took place in a comfortable environment for the patient. The patient was lying on his stomach without clothes, the needle injection point corresponded to the level of a herniated disc confirmed by MSCT. The injection site was treated with 96% alcohol, anesthetized with 1% lidocaine and special needles in the amount of 2 or 3 intended for the daughter, and an acupotomy was performed. The needle was inserted to a depth of 50-60 mm. deep into the muscles of the back, an acupotomy was performed, i.e. movement of the needle up, down, forward and backward. After the procedure, the needle was removed and a negative pressure jar was applied to the injection site for 5 minutes to suck out the accumulated blood. Then a sterile cloth was placed on the injection site.

The third group received treatment according to the scheme standard treatment + dry + hirudotherapy. Hirudotherapy was performed using medical leeches in the amount of 3-5 pieces per session (depending on the patient's weight). Hirudotherapy sessions were performed outside of dochim courses, i.e. both treatment methods were not performed on the same day in order to prevent uncontrolled bleeding. The course of treatment was 5-7 sessions.

After the course of treatment, all patients in all groups who complained at admission noted an improvement in well-being. Nevertheless, we noted a noticeable disappearance of pain on the Borg scale in the third study group with an average of 0.46 ± 0.65 points by 93.9% ($p < 0.01$) and a partial disappearance was noted in the second group with an average of 1.8 ± 0.73 points by 74.3% ($p<0.01$). After treatment, we also observed changes in the size of the hernia, which in the first group decreased by an average of 6.14 ± 0.8 mm, the difference between the sizes before and after treatment was 19.84% ($p < 0.01$), in the second group after treatment, the average size of the hernia decreased to 7.62 ± 2.58 mm by 9.6% ($p< 0.01$). In the third group, after treatment, the average hernia size decreased to 6.24 ± 1.79 mm by 19.5% ($p < 0.01$).

Based on the results of the study, we found that the use of an integrated approach is the most effective strategy for preventing recurrence of degenerative spine diseases. A 47% decrease in the recurrence rate in the third group indicates the need for further implementation of such techniques in clinical practice.

Based on the results of the measures carried out, it was concluded that the standard technique is most effective in reducing the size of the hernia (19.84%), while an integrated approach with the inclusion of hirudotherapy shows the highest effect in reducing pain (93.9%). The combined method (traditional technique + Dochim technique) is more effective in relieving pain (74.3%) compared to the standard treatment method alone, but less effective in reducing the size of the hernia (9.6%), in addition, the integrated approach reduces the frequency of recurrence of spinal diseases by 47%, which confirms its effectiveness and the need for implementation in clinical practice.

Economic importance: To assess the economic importance of applying an integrated approach to the treatment and prevention of herniated disc recurrence, it is necessary to take into account medical conditions, as well as the cost of procedures and treatment.

1. The cost of treatment and surgical intervention

In our country, the cost of treatment and surgery differs significantly from Western countries, but even at the local level, the treatment of a herniated disc, including surgery, is quite expensive.

The average cost of an intervertebral hernia surgery is 8 000 000 – 12 000 000 sum (approximately 700 – 1000 USD). This is the cost of surgery, hospitalization, and postoperative care.

The cost of repeated surgery and hospitalization for patients in need of treatment for recurrent herniated discs also depends on the complexity of the intervention and the region. The cost of one repeat operation is about 10,000,000 soums (approximately 850 USD).

2. Savings while reducing the number of relapses:

Let's say the recurrence rate without an integrated approach is 25%, and with an integrated approach — 13% (as in your study, a decrease of 47%).

- Total number of patients: 153.
- Average cost of repeated surgery: 10,000,000 soums ($850).

Without an integrated approach (25% recurrence rate):

- Number of relapses: 153x0.25 = 38 patients.
- The cost of repeated operations: 38 × 10 000 000 soums = 380 000 000 soums.

With an integrated approach (recurrence rate of 13%):

- Number of relapses: 153 × 0.13 = 20 patients.
- The cost of repeated operations: 20 × 10 000 000 soums = 200 000 000 soums.

Savings on repeat operations:

380,000,000 soums − 200,000,000 soums = 180,000,000 soums (about 15,300 USD).

3. Savings on hospitalization and rehabilitation

In Uzbekistan, the cost of one day of hospital stay is approximately 300 000 – 500 000 sum (25 – 45 USD), depending on the level of the clinic and the city.

Let's say that patients receiving standard treatment stay in the hospital for 10 days, and patients receiving complex therapy can reduce their hospitalization by 3 days due to more effective treatment.

Saving on hospitalization:

- The cost of hospitalization of standard treatment: 153 patients × 10 days × 400,000 soums = 6,120,000,000 soums.
- The cost of hospitalization with complex treatment (with a reduction of 3 days):

153 patients × 7 days × 400,000 soums = 4,284,000,000 soums.

Saving on hospitalization:

6,120,000,000 soums − 4 284 000 000 sum = 1,836, 000,000 soums (about $155,000).

4. Savings on lost working days

To calculate the savings on lost working days, let's take the average cost of one working day. This value can be approximately 50,000 soums (about 4 US dollars).

Let's assume that patients without comprehensive treatment lose an average of 30 working days per year due to the disease, while with comprehensive treatment this figure decreases.

- Without complex treatment:

38 patients × 30 days × 50,000 soums = 57,000,000 soums.

- With complex treatment:

20 patients × 30 days × 50,000 soums = 30,000,000 soums.

Saving on lost working days:

57,000,000 soums − 30,000,000 soums = 27,000,000 soums (about 2,300 US dollars).

5. Overall economic effect

Now let's summarize the economic benefits of using an integrated approach.:

- Savings on repeat operations: 180,000,000 soums (USD 15,300).
- Savings on hospitalization: 1,836,000,000 soums (US$155,000).
- Savings on lost working days: 27,000,000 soums (2,300 USD).

Overall economic effect = 180,000,000 soums + 1 836 000 000 sum + 27,000,000 soums = 2,043,000,000 soums (about 172,600 US dollars).

Conclusion An integrated approach to the treatment and prevention of herniated disc recurrence in Uzbekistan demonstrates significant economic benefits. The total savings may amount to about 2,043,000,000 soums (about 172,600 US dollars), which will justify the need to introduce such treatment methods into clinical practice, especially given the reduction in the frequency of relapses and improvement in the quality of life of patients.

4. Conclusions

As a result of the study, it was found that an integrated approach to the treatment of intervertebral hernias, including standard treatment, pacemaking and hirudotherapy, demonstrates the greatest effectiveness in reducing pain and preventing recurrence of the disease. The standard treatment showed the best result in reducing the size of the hernia, while the combined method with the Daughter's method proved to be more effective in relieving pain. The introduction of complex therapy can significantly reduce the frequency of relapses and improve the quality of life of patients.

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