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PREDICTIVE VALUE OF THE DURATION OF SCIATICA FOR LUMBAR DISCECTOMY

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Abstract: The optimal time for lumbar discectomy due to sciatica is still under discussion. We examined a group of 177 consecutive patients with lumbar disc herniation, who underwent lumbar discectomy. According to the duration of the sciatica, patients were divided into 3 groups: 31 (17.5%) patient with a duration of sciatica from 0 to 3 months, 82 (46.3%) patients with a duration from 4 to 10 months, and 64 (36.2%) with a duration longer than 10 months. The assessment of postoperative health status was done with the Oswestry Disability Index 2.0 (ODI scoring) one year after the surgery. Statistical data have shown that there was no significant difference between the patients operated on in the period from 0–3 and 4–10 months ($p > 0.05$). There was a significant difference between the patients operated on in the period from 0–3 months and > 10 months ($p > 0.001$). There was also a significant difference between the patients operated on in the period from 4–10 months and those operated > 10 months ($p < 0.001$). This goes in favour of achieving the best results in patients with a duration of sciatica from 0 to 3 months. The worst results were obtained in those with a duration of sciatica > 10 months.

Key words: duration of sciatica, lumbar discectomy.

Introduction

Low back pain is a widespread problem that affects up to 60–90% of the adult population at some time during their active life [13]. It is the second

leading reason for which patients pay visits to practitioners in the United States [8]. The costs for the treatment are enormously high. In 1990, 75–100 billion dollars were spent in the USA [12]. In this complex of symptoms, sciatica as a result of lumbar disc herniation takes the most prominent place. In addition to the radiating pain in the affected leg along the dermatoma that has been innervated by the lumbar nerve root, there are also motor deficits as well as sensibility impairment and abnormalities in muscle-tendon reflexes. Around 5–10 cases per 1000 citizens in the Western countries have had sciatica at least once a year with variable pain intensity and variable course of the disease [13]. Prolapsed intervertebral disc is a very common phenomenon. It has been registered in one fourth of the MRI lumbosacral spine and it can even be detected in asymptomatic cases [5]. Some of the studies have shown that 60% of the cases may be explained to a larger degree by genetic factors than by other factors, such as: occupation, trauma, proper sitting, exposure to excessive driving, etc. [4].

A large number of controversies hang over the type of treatment of lumbar disc herniation. There is no doubt that there are many authors who speak in favour of either conservative or surgical treatment.

The pain usually diminishes within the first 6 weeks in 70% of the patients [23]. Many authors recommend for the remaining patients surgery that should be performed before 8 weeks if they have aprogressive neurological deficit [15, 16].

Management problems emerge if severe pain lasts for more than 8 weeks. However, there has been disagreement on this issue since some authors have demonstrated that even at this stage many people will recover with conservative treatment [11].

Surgical treatment is effective in reducing radicular pain in 90% of patients. The effect of low back pain reduction is much smaller. At least 70% of patients will report low back pain after surgery. Up to 10% of patients will have more serious back pain after surgery [11].

On the other hand, a poor postoperative outcome is a major health-care problem. Studies have shown that even 20–40% of the operated patients have persistent sciatica or recurrent disc herniation.

Up to 5% of operated patients report more serious pain postoperatively and 1% have neurological damage [15].

In order to improve the postoperative results, researchers focus their attention on more detailed preoperative examination, more detailed history of the disease and, which is most important, the selection of patients who would undergo surgical treatment. In pursuing the selection of patients, several factors of predictive character have been promoted. One of the least examined factors is the duration of sciatica preoperatively or the so-called timing of the surgery.

Disagreement upon optimal timing of surgery, that is duration of sciatica, has shown great variations in different countries [4].

Material and methods

This prospective study included 177 consecutive patients with lumbar disc herniation, sciatica and neurological findings. All patients were operated on for the first time by the same team of doctors. The inclusion criteria were as follows: (1) a diagnosis of sciatica with predominant leg pain greater than low back pain, (2) a preoperative MRI confirming presence of disc herniation, (3) disc herniation on one level, (4) all patients have undergone physical therapy postoperatively. Exclusion criteria were: (1) a history of a previous low back operation, (2) spinal infections, (3) spinal malignancies, (4) associated spinal stenosis.

According to the duration of sciatica patients were divided into 3 groups: A) 0–3 months, B) from 4 to 10 months, C) >10 months. *This division was made in agreement with the traditional understanding and habits in our country.*

Group A consisted of the smallest number of patients (17.5%) because of the fear of spinal surgical intervention, which is a traditional fear in our country. Only patients with intolerable pain decide for surgical treatment in a very short time period as a result of despair from the severe pain. This statement is supported by the high percentage of patients who comprised this group (71%) with severe and unrelenting pain (8–10 points according to the numerical rating scale of pains).

The largest number of patients (46.3%) was included in group B (from 4 to 10 months). During that period patients had sufficient time to undergo physical therapy as recommended by their physician, or sometimes to undergo physical therapy on their own initiative or to consult laymen in order to postpone the surgical intervention.

Group C comprised 36.2% of the patients who decided to undergo surgical intervention after a longer period of time, from 10 to 12 months.

"Conventional discectomy through interlaminar fenestration" was applied in the case of all patients. Preoperative demographic data, clinical signs and diagnostic examinations were completed on a form for each patient by the examiner.

The assessment of postoperative outcome was done by an independent neurosurgeon as well as vascular surgeon and internal medicine doctor, that had not been included in the team for the treatment of the patients, 12 months after surgery, by interviews during regular check-ups. For evaluation of the postope-

rative results the Oswestry Disability Index 2.0 (ODI scoring) was used. A numerical rating scale of pain was used for assessment of pain intensity.

The patients were divided according to pain intensity on the numerical scale of pain that has grades from 0 to 10. In line with this, patients were divided into four categories: 1) without pain (0 points), 2) with mild pain (1–3 points), 3) with moderate pain (4–7 points), 4) with severe to intolerable pain (8–10 points).

In group A (0–3 months), 25 (81%) of patients had severe to intolerable pain (8–10 points) and 6 (19%) had moderate pain (4–7 points).

In group B (4–10 months), 32 (39%) patients had severe to intolerable pain (8–10 points), 40 (49%) had moderate pain (4–7 points) and 10 (12%) had mild pain (1–3 points).

In group C (>10 months), 24 (37.5%) patients had severe to intolerable pain (8–10 points), 32 (50%) had moderate pain (4–7 points) and 8 (12,5%) had mild pain (1–3 points).

Statistical methods

Statistical analysis of data was done using the Statistica 7.1/2005 statistical programme.

1. In analysing the series with attributive features, structure percentages were determined;

2. In the series with numerical features, testing of data distribution was done;

3. Measures of central tendency were determined with basic statistics;

4. Difference in values of ODI scoring among the three groups of patients was tested with the Kruskal-Wallis Anova Test (H);

5. Difference in values of ODI scoring between two groups of patients was tested with the Mann-Whitney U Test (Z);

6. Correlation between the duration of sciatica and changes in ODI scoring was determined with the Spearman Rank Order Correlation (R).

The data are presented in tables and figures.

Results

The investigation included 177 patients, of whom 103 (58.2%) were male and 74 (41.8%) were female.

Table 1 presents the distribution of operated patients with reference to ODI scoring and the duration of sciatica. Of 31 (17.51%) patient with a duration

of sciatica from 0–3 months, the largest number – 14 (45.16%) had an ODI scoring of 0–20%.

In 82 (46.33%) patients with a duration of sciatica from 4 to 10 months, 31 (37.80%) patients predominated with ODI scoring 21–40% and 29 (35.37%) patients had ODI scoring 21 (40%).

Of 64 (36.16%) patients with a duration of sciatica > 10 months, 26 (40.63%) patients with ODI scoring 41–60% predominated in comparison with the remaining ones.

Table 1 – Табела 1

Distribution of patients according to duration of sciatica and ODI scoring

Дистрибуција на пациентите според времетраењето на лумбоишијалгијата и ODI scoring-от

	ODI scoring					
Months	0–20%	21–40%	41–60%	61–80%	81–100%	**Total**
A (0–3 m)	14	8	6	3	0	31
B (4–10m)	31	29	14	8	0	82
C (> 10 m)	5	16	26	17	0	64
Total	50	53	46	28	0	177

The linear diagram in Figure 1 presents the dynamics of changes in ODI scoring in all three groups of patients depending on the duration of sciatica. Patients with ODI scoring from 0–20% dominated in the groups with a duration of sciatica from 0–3 and 4–10 months, after which the linear diagram drops down.

In patients with a duration of sciatica > 10 months, the linear diagram in the interval from 0–20%, 41–60% and 61–80% of ODI scoring shows higher values of the patients than in the previous groups. The highest values of the number of patients were in the interval from 41–60% of ODI scoring.

Table 2 presents the descriptive statistics of the values of ODI scoring in operated patients depending on the duration of sciatica.

The values of ODI scoring in the patients of group A (0–3 months) varied in the interval 31.71 ± 19.40.

The values of ODI scoring in the patients of group B (4–10 months) varied in the interval 33.00 ± 18.01.

The values of ODI scoring in the patients of group C (>10 months) varied in the interval 49.91 ± 18.09.

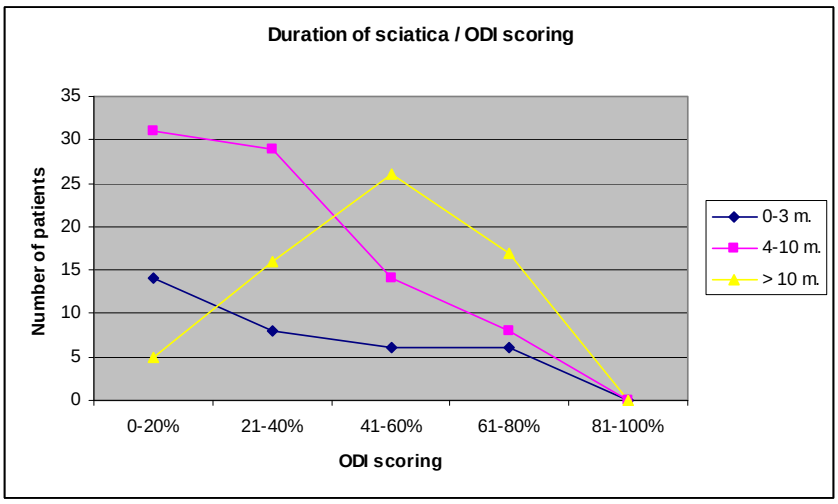

Figure 1 – Comparison between duration of sciatica and ODI scoring

Слика 1 – Компарација помеѓу времетраењето на лумбоишијалгијата и ODI scoring-от

Table 2 – Табела 2

Descriptive statistics / ODI scoring

Дескриптивна статистика / ODI scoring

Months / Group	**N**	**Mean**	**Confidence –95.0%**	**Confidence +95.0%**	**Min**	**Max**	**Std.Dev.**
A (0–3 m)	31	31.71	24.59	38.83	13.00	80.00	19.40
B (4–10m)	81	33.00	29.02	36.98	10.00	80.00	18.01
C (> 10 m)	64	49.91	45.39	54.42	17.00	80.00	18.09

For H = 31.89 and $p < 0.001$ ($p = 0.0000$) there was a significant difference of the values of ODI scoring among the three groups of operated patients.

There was no significant difference in the values of ODI scoring between patients with a duration of sciatica from 0 to 3 months (A) and patients with a duration of sciatica from 4 to 10 months (B) for Z = -0.61 and $p > 0.05$ ($p = 0.54$) (Table 3). For Z = -4.28 and $p < 0.001$ ($p = 0.000$) the third group of patients C (> 10 m) had significantly higher values of ODI scoring than the first group of patients A (0–3 months) (Table 3).

The tested difference of ODI scoring between the second group B (4–10 m.) and the third group C (> 10 m.) of patients showed that the values of ODI

scoring were significantly higher in the third group for Z = -5.13 and p < 0.001 (p = 0.000) (Table 3).

If we analyse the average values of ODI scoring (Table 2), it is obvious that the patients from group A (x = 31.71) had the best postoperative results, followed by the patients from group B (x = 33.00), whereas the patients from the third group had the highest average values of ODI scoring, that is, the worst postoperative results (x = 49.91).

Table 3 – Табела 3

Differences in values of ODI scoring depending on duration of sciatica
Разлики во вредностите на ODI scoring-от во зависност од времетраењето на лумбоишијалгијата

Group	Rank Sum Group 1	Rank Sum Group	Z	p – level	Sig. / N.Sig.
A / B	1672.50	4768.50	-0.61	0.54	p > 0.05
A / C	949.00	3611.00	-4.28	0.0000	p < 0.001
B / C	4726.50	6004.50	-5.13	0.0000	p < 0.001

Figure 2 presents the examined relationship between duration of sciatica and number of patients depending on the values of ODI scoring by groups. For R = -0.50 (Spearman's Rank Correlation Coefficient) there was a moderately strong negative correlation. Increase of the duration of sciatica was associated with reduction of the number of patients who had better postoperative results, that is lower values of ODI scoring.

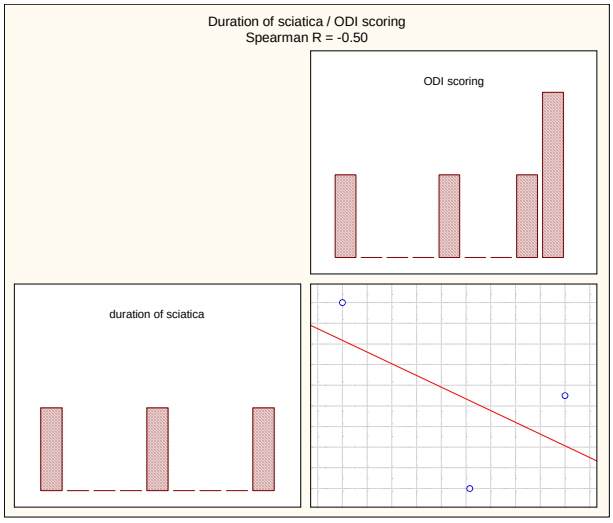

Figure 2 – Relationship between duration of sciatica and number of patients depending on values of ODI scoring by groups

Фигура 2 – Зависноста помеѓу времетраењето на лумбоишијалгијата и бројот на пациенти и вредностите на ODI scoring-от по групи

Discussion

Our study has shown that duration of sciatica statistically correlates with the better postoperative results that are presented by ODI scoring. There is also a greater degree of satisfaction with the postoperative results in patients with a shorter time duration of sciatica. The results have indicated that there is an increased degree of risk to favourable postoperative results in patients who have had sciatica for more than 10 months. In the interval up to 10 months the results obtained in this study demonstrated that there was no significant difference between the different intervals (0–3 m.) and (4–10 m.), although the best postoperative results were achieved in the interval from 0–3 months.

Literature data about the influence of duration of sciatica on postoperative outcome reports are variable.

A larger group of authors [2, 9, 14, 19, 21] have come to the same conclusions as we did in our study, that the duration of sciatica for less than 2 months gives the most favourable results. It seems that a better postoperative outcome is achieved in this time interval (0–3 m.) than in the interval 4–10 m. because the majority of the patients had severe to intolerable pain. This means that they did not have the choice and the time to postpone the surgery. This coincides with the results obtained in other studies [22] that severity of pain significantly shortens the length of preoperative disease history.

On the other hand, it has been suggested that patients with long-term sciatica are at risk of developing chronic pain [18]. The findings of our study that postoperative results are evidently worsened in patients with a duration of sciatica of more than 10 months are in agreement with other studies [17, 18].

Conclusions

We can conclude that the duration of sciatica has a predictive role on the functional outcome in patients who are to undergo surgical intervention for lumbar disc herniation.

The best results are attained in patients where the duration of sciatica is as short as possible. Our study has pointed to the fact that in the interval 0–3 m. of duration of sciatica, the postoperative results are the best. In patients where the sciatica has lasted longer than 10 months, the postoperative results are extremely bad.

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Резиме

ПРЕДИКАТИВНАТА ВРЕДНОСТ НА ВРЕМЕТРАЕЊЕТО НА ЛУМБОИШИЈАЛГИЈАТА КАЈ ЛУМБАЛНАТА ДИСЕКТОМИЈА

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Оптималното време за лумбална дисектомија поради лумбоишијалгија е сè уште дискутабилно и непрецизирано. Ние испитувавме група од 177 консекутивни пациенти со лумбална дискус херниј кај кои е направена лумбална дисектомија. Според времетраењето на лумбоишијалгијата пациентите се поделени во три групи: од 0–3 месеци со 31 (17,5%) пациент, од 4–10 месеци со 82 (46,3%) пациенти и преку 10 месеци со 64 (36,2%) пациенти. Оценувањето на постоперативната состојба е вршено преку Oswesty Disability Index 2.0 (ОДИ scoring) една година по операцијата. Статистичките податоци покажуваат дека нема некоја сигнификантна разлика кај пациентите кои биле оперирани во периодот од 0–3 и 4–10 месеци ($p > 0,05$). Помеѓу пациентите оперирани од 0–3 месеци и > 10 месеци постои сигнификантна разлика ($p <$

0,001). Исто така и помеѓу пациентите оперирани од 4–10 месеци и оние оперирани > 10 месеци постои сигнификантна разлика (p < 0,001). Тоа говори дека најдобри резултати се постигнуваат во перидот од 0–3 месеци од времетраењето на лумбоишијалгијата. Убедливо најлоши резултати се постигнуваат кај пациентите со времетраење на лумбоишијалгијата > 10 месеци.

Клучни зборови: времетраење на лумбоишијалгија, лумбална дисектомија.

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