MEDICAL SCIENCE MONITOR

CLINICAL RESEARCH

e-ISSN 1643-3750
© Med Sci Monit, 2016; 22: 4446-4454
DOI: 10.12659/MSM.898252

Received: 2016.02.28
Accepted: 2016.04.07
Published: 2016.11.19

Assessment and Determinants of Spinal Pain in the Course of Disc Disorders Treated Surgically

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABCDEF 1 Renata Jabłońska
DEF 1 Robert Ślusarz
DEF 1 Agnieszka Królikowska
DEF 1 Beata Haor
C 2 Magdalena Zając

1 Department of Neurological and Neurosurgical Nursing, Nicolaus Copernicus University, Ludwik Rydygier Collegium Medicum in Bydgoszcz, Bydgoszcz, Poland
2 Department of Psychology, Kazimierz Wielki University in Bydgoszcz, Bydgoszcz, Poland

Corresponding Author: Renata Jabłońska, e-mail: renata.jablonska@cm.umk.pl
Source of support: Departmental sources

Background: Intervertebral disc disease is defined as a complex of structural changes in the aftermath of disorders of mutual elements, the structure of which form the discus intervertebralis and the spinal canal. The present work assessed pain in patients who were surgically treated due to spinal discopathy and analyzed factors that determine the condition.

Material/Methods: The research was carried on a group of 187 patients diagnosed with discopathy of the lumbosacral and cervical segment. The data are discussed in the context of medical records and the Visual Analogue Scale used for pain assessment. We used a prospective study plan with a 3-time assessment.

Results: The pain level observed among patients prior to the procedure (M=6.52) was higher than after 7 days (M=3.15) and 6 months from the operation (M= 3.45). The highest level of pain (M=6.88), with a relatively high consistency among the patients (SD=2.25), was observed in the case of left-side hernia (H=7.31; p=0.023). The influence of the analyzed factors on pain experience markedly increased by the third assessment (R2=0.14), and was strongly associated with the type of work performed by the patient.

Conclusions: Surgical operation significantly reduces pain in patients with disc disorders. The level of pain is predominantly affected by the location of the hernia and the type of work performed by the patient.

MeSH Keywords: Intervertebral Disc • Pain • Spinal Diseases

Full-text PDF: http://www.medscimonit.com/abstract/index/idArt/898252

3772 5 — 50

Indexed in: [Current Contents/Clinical Medicine] [SCI Expanded] [ISI Alerting System] [ISI Journals Master List] [Index Medicus/MEDLINE] [EMBASE/Excerpta Medica] [Chemical Abstracts/CAS] [Index Copernicus]

Background

Intervertebral disc disease refers to a set of structural changes resulting from the disruption of the integrity of elements that form the intervertebral disc and the vertebral canal [1]. The term "intervertebral disc disease" covers various types and degrees of disc disorders leading to nucleus pulposus herniation [1,2]. The degenerative process occurring in nucleus pulposus commences with damage to the fibrous ring of an intervertebral disc [3]. The development of degenerative changes involves, among other things, a destabilization stage featuring pathological intersegmental mobility and symptoms of vertebra strain. This often coincides with intervertebral disc herniation, as well as nerve root and spinal cord complications [4]. Disc degeneration is thus an agent of degenerative disc disease, which occurs most frequently as discopathy [5].

The results of analysis of epidemiological studies indicate that between 45% and 85% of the general population tend to experience back pain at some point in life; 35–40% of people complain of having pain once a month, while 15–30% tend to experience it on an everyday basis [6,7]. In 10–20% of cases, the symptoms of intervertebral disc disorder are abrupt and occur without any apparent cause, and 50–60% of instances are related to physical exercise or lifting heavy objects. In 30–40% of cases, the disorder develops slowly and is preceded by mild back pain, which may intensify in the course of daily activities and work, and gradually leads to deterioration of the patient's condition [2,8,9]. If untreated, pain may render basic everyday activities, such as dressing or washing oneself and fulfilling physiological needs, increasingly difficult, thus leading to a marked decrease in the quality of life. It is estimated that the pain resulting from disc disorders constitute the main cause of physical impairment in patients under the age of 45 [10]. There is increasing evidence that socio-psychological factors exert marked influence on the prognoses regarding the results of treatment, especially when the treatment is oriented towards reducing pain [11].

An intervertebral disc disorder is an often cause of back pain (in 60–90% of cases). The pain is considered to be a particularly severe health problem due its common occurrence and chronic nature. Pain may be caused not only by a degenerated intervertebral disc, but also degenerated zygapophysial joint or nerve root compression arising from a protruding intervertebral disc or osteophytes. In practice, there are 2 groups of patients with the same disorder (degeneration of a disc), but showing different symptoms (neck/back pain *vs.* root pain), and it is unclear why certain degenerated intervertebral discs are prone to herniate and cause limb pain, while others tend to cause local pain instead [12].

Treatment of degenerated intervertebral discs in the course of discopathy, which is believed to be the most frequent cause of back/neck and root pain, employs both conservative and surgical approaches. Both therapeutic methods aim at easing the disc-root conflict; however, not all patients who undergo treatment show permanent improvement; relapse of root pain syndromes tends to occur after either of these 2 treatments, but it is less likely in the case of surgical removal of nucleus pulposus herniation [13]. Nevertheless, conservative measures are considered essential: lifestyle change pharmacotherapy, physical therapy, and motor rehabilitation [14]. Surgical treatment in this case is part of an acknowledged course of action; nevertheless, its efficacy tends to be regarded as controversial, as the procedure aims at minimizing the symptoms rather than the cause of pain [8]. It should be noted that while surgical treatment is regarded as a last resort, for a certain percentage of patients (about 15%) it is the only available effective method of treatment [15]. The main indications for surgical treatment include: lack of desired improvement after about 6–7 weeks of conservative treatment, as well as nerve root compression in the vertebral canal, resulting in motor deficit.

New treatment methods are constantly being tested in relation to degenerative disc disease and it is difficult to indicate one that may be considered the best or most efficient. This is true for both conservative and surgical treatments. High hopes are held for gene therapy, using inhibitors of proinflammatory cytokines, as well as chondrocyte and cartilage-bone fragments transplantation [4]. As far as neurosurgery is concerned, increasing attention is given to the potential use of low-invasive methods. While current strategies aim to remove the pain generator through surgery, emerging modalities aim to reverse the degenerative cascade through the use of biologics and gene modification [9].

The paper aims to assess pain in patients who underwent a surgical operation for a degenerative disc disease in the course of discopathy, as well as to identify the determinants of this condition. The research problems were formulated into the following questions:

1. In what way does surgical treatment affect the intensity of pain reported by patients with discopathy?
2. What is the influence of clinical factors (clinical diagnosis, intraoperative diagnosis, protrusion, past history of spinal operations) on the occurrence of pain in patients within a given period of time?
3. What is the influence of sociodemographic factors (sex, age, place of residence, education, occupational status, type of work) on the occurrence of pain in patients within a given period of time?
4. Which factors tend to have the strongest effect on a patient's pain experience?

Indexed in: [Current Contents/Clinical Medicine] [SCI Expanded] [ISI Alerting System] [ISI Journals Master List] [Index Medicus/MEDLINE] [EMBASE/Excerpta Medica] [Chemical Abstracts/CAS] [Index Copernicus]

Material and Methods

Study setting and design

The study was conducted at the Neurosurgery and Neurotraumatology Ward of University Hospital and involved patients diagnosed with degenerative disc disease in the course of discopathy in cervical or lumbosacral spine segment who had been found eligible for surgical treatment. The selected patients had to meet the following criteria: 1) diagnosis of degenerative disc disease in the course of discopathy in cervical or lumbosacral spine; the diagnosis was made by 2 independent medical doctors (radiologist and neurosurgeon) based on clinical examination confirmed with MRI of a given spine segment; 2) past medical history of a single microdiscectomy procedure; 3) documented prior conservative treatment (pharmacotherapy, physical therapy); persistent root pain; and 4) lack of any complications in the postoperative period (disc space infection). The following criteria excluded patients from the study: 1) diagnosis of disc disease other than degenerative disc disease in the course discopathy of cervical or lumbosacral spine segment; 2) past medical history of more than 1 microdiscectomy procedure; 3) postoperative disc space infection; and 4) having been discharged from hospital before or after the 7th day after surgery.

To achieve our study objectives, we used a prospective study design with a 3-time assessment: The first assessment was conducted a day before the scheduled surgical procedure (187 patients), the second was performed on the day of discharge from the ward (on the seventh day after the operation; 187 patients), and the third 6 months after the operation (a survey sent via mail and filled in by the interviewees at home; 138 patients). Out of all surveys sent, 74% were returned completed. The result was deemed satisfactory and was considered sufficient for a study in the field of health [16].

Instruments

The study utilized a standard measurement instrument – the Visual Analogue Scale (VAS) [17] – and the analysis of medical records.

The VAS scale allows for a subjective assessment of patient pain. It is a 10-point scale from 0 to 10, where 0 means lack of pain and 10 means excruciating, agonizing pain. The study assessed the level of leg and back pain in patients suffering from discopathy L-S, as well as neck and upper-limbs pain in the case of discopathy in segment C.

Medical records (case records) served as a source of clinical and sociodemographic data. Clinical variables taken into consideration included: diagnosis, direction of nucleus pulposus protrusion or disc prolapse, its extent (protrusion, prolapse, extrusion), level of operation, and the time between the first and the last pain sensation before the surgical procedure. The study also considered sociodemographic data, such as sex, age, place of residence, education, occupational status, and type and character of work. The above variables were analyzed with regard to the level of pain in the period preceding and following the procedure.

Ethical considerations

The study was approved by the Local Bioethics Commission. All the participants gave their informed consent in writing to take part in the study.

Statistical analysis

The statistical analysis of the results was carried out using the STATISTICA 9.0 suite. The variables were presented by means of descriptive statistics, such as arithmetic mean, standard deviation, and variation coefficient. The differences between individual measurements were estimated with non-parametric tests: Friedman ANOVA and Wilcoxon test. The differences between the groups were analyzed with the Kruskal-Wallis ANOVA test. The significance of factors was determined with a multiple regression model. Test values of $p<0.05$ were considered statistically significant.

Results

Demographic data

The study was conducted among 187 patients admitted for a degenerative disc disease in the course of discopathy. The average age was 44.3 years, with the youngest patient being 22 and the oldest 72. More than half of the interviewees – 54.5% – were women. There were 142 patients (75.53%) diagnosed with discopathy of the lower region of the spine (lumbosacral, L-S), and the remaining 24.47% had discopathy of the upper segment (cervical, C). The percentage of patients with primary or higher education did not exceed 18% in either of the sex-related categories. Most (90%) of the respondents were professionally active and most (60.56%) had jobs involving physical labor. Patients living in larger cities were more likely to have sedentary jobs. Most of the patients participating in the study were diagnosed with left- or right-sided hernia. Over 70% of the interviewees had their L5–S1 segment operated on. During the procedures they were usually diagnosed with a protrusion. Detailed characteristics of patients participating in the study are presented in Table 1.

Duration of pain

Time was analyzed with respect to first and last sensation of back pain before the operation. The average period of time

Indexed in: [Current Contents/Clinical Medicine] [SCI Expanded] [ISI Alerting System] [ISI Journals Master List] [Index Medicus/MEDLINE] [EMBASE/Excerpta Medica] [Chemical Abstracts/CAS] [Index Copernicus]

Table 1. Characteristics of the study population.

Sex	Education									
	Primary		Vocational		Secondary		University degree		Total	
	n	%	n	%	n	%	n	%	n	%
Females	18	9.63	34	18.18	36	19.25	14	7.49	102	54.55
Males	15	8.02	33	17.65	24	12.83	13	6.95	85	45.45
Place of residence	**Character of work**									
	Sedentary		Standing		In motion				Total	
	n	%	n	%	n	%			n	%
Rural area	9	6.39	18	12.77	43	30.50			43	30.50
Urban area	40	28.37	36	25.53	98	69.5			98	69.5
Type of work	**Occupational status**									
	Student		Professional work		Pension/ disability pension		Unemployed		Total	
	n	%	n	%	n	%	n	%	n	%
Physical	1	0.53	86	45.98	26	13.9	15	8.02	128	68.43
Clerical	1	0.53	41	21.92	10	5.34	7	3.74	59	32.06
Medical diagnosis	**Protrusion – side**									
	Right		Left		Center				Total	
	n	%	n	%	n	%			n	%
Discopathy L-S	60	31.91	74	39.36	8	4.26			142	75.93
Discopathy C	16	8.55	20	10.69	9	4.81			45	24.06

Table 2. Duration of pain ailments.

Time until the operation	n	Mean	Min	Max	SD
From the first pain	187	78.4468	1.0000	360.0000	78.88584
From the last pain	187	4.3670	1.0000	36.0000	4.51005

from the first experience of symptoms was approximately 79 months; the longest was 360 months and the shortest was 1 month. The final exacerbation occurred on average 4 months before the procedure. The data are presented in Table 2.

Pain assessment in the study period

The results indicate a significantly higher level of pain in patients during the preoperative period (M=6.52) than after 7 days or half a year from the surgical procedure. A statistically significant difference (H=141.46; p<0.001) was confirmed for the results of measurements taken before and after surgery. However, the analysis of measurement pairs did not indicate any significant differences in pain level between the second and third assessment (Z=1.13; p=0.258). The observed minor increase in pain level among patients during the third assessment was considered statistically insignificant and may be attributed to a lower number of interviewees. Furthermore, other factors may have distorted their perception of pain (e.g., time). This is also confirmed by the fact that the variation coefficient (V=74.80) was higher than in the second assessment (V=71.32), which demonstrates differences in patients' subjective pain perception. The data are presented in Table 2.

Indexed in: [Current Contents/Clinical Medicine] [SCI Expanded] [ISI Alerting System] [ISI Journals Master List] [Index Medicus/MEDLINE] [EMBASE/Excerpta Medica] [Chemical Abstracts/CAS] [Index Copernicus]

Table 3. Pain level in the context of time and differences related to clinical variables.

	VAS Scale								
	Assessment 1.			Assessment 2.			Assessment 3.		
	Mean	H	p	Mean	H	p	Mean	H	p
Medical diagnosis									
Discopathy L-S	6.66	2.62	0.10	3.15	0.00	0.99	3.47	0.04	0.83
Discopathy C	6.06		3.15			3.37			
Intraoperative diagnosis									
Prolapse	6.49	0.42	0.65	3.32	0.59	0.55	3.29	0.23	0.78
Protrusion	6.45		3.13			3.47			
Extrusion	6.95		2.70			3.77			
Protrusion									
L-side	6.88	7.31	0.02	2.84	1.23	0.29	3.54	0.17	0.84
R-side	6.31		3.35			3.43			
Central	5.41		3.41			3.12			
History of spinal operations									
Yes	6.06	0.69	0.40	3.4	0.19	0.66	3.50	0.00	0.94
No	6.56		3.13			3.44			

Pain and clinical factors

Among all the variables under analysis, only preoperative pain (first assessment) differed according to lateral location of a herniation protrusion. The difference between the patients with various locations of discopathy was 1.5 on the 10-point scale applied (Table 3) and was statistically significant (H=7.31; p=0.023). The highest level of pain (M=6.88), at a relatively high consistency among interviewees (SD=2.25), was observed in patients diagnosed with left-sided hernia. Patients with right-sided hernia reported slightly lower pain level (M=6.31) at a similar variability of results (SD=1.99). The lowest pain level (M=5.41) was reported by patients with central hernia. The last group was at the same time highly varied in terms of pain perception (SD=2.45).

The impact of the remaining factors on pain level is presented in Table 3. These results show that patients diagnosed with discopathy in the L-S segment experienced a slightly higher level of pain in the first (M=6.66) and the third (M=3.47) assessment. If a patient had earlier undergone another spine surgery, the of pain was lower before the operation (M=6.06), yet slightly higher after the procedure in comparison to patients operated on for the first time. The patients intraoperatively diagnosed with extrusion had a higher level of preoperative pain (M=6.95) than in the remaining intraoperative diagnoses. However, they reported lower level of pain during the second assessment. At half a year after the procedure, these people again reported stronger pain than the interviewees diagnosed with a prolapse or protrusion. Nevertheless, these tendencies did not display any statistically significant variability.

Pain and sociodemographic factors

The differences in the study results related to individual factors are presented in Table 4. In all the periods under discussion, the highest level of pain was observed in women. Patients living in cities experienced more acute pain during the preoperative period. The interviewees with lower education had stronger perception of pain before the procedure, and the lowest at 7 days after the surgery. In the long-term perspective, patients with higher education tended to experience the least pain. The patients who had a physical labor job prior to the surgery declared higher level of pain. However, 1 week after the procedure, the reported pain was milder in comparison to clerical workers. The results also slightly differed by the type of responsibilities the patient had; those who had a more dynamic kind of work had a stronger sensation of pain in the preoperative period. After 7 days, patients who had a sedentary job reported the highest level of pain. In the long-term perspective, interviewees who had been doing physical work were prone to experience more severe pain.

Indexed in: [Current Contents/Clinical Medicine] [SCI Expanded] [ISI Alerting System] [ISI Journals Master List] [Index Medicus/MEDLINE] [EMBASE/Excerpta Medica] [Chemical Abstracts/CAS] [Index Copernicus]

Table 4. Pain level in the context of time and differences related to sociodemographic variables.

	VAS Scale								
	Assessment 1.			Assessment 2.			Assessment 3.		
	Mean	H	p	Mean	H	p	Mean	H	p
Sex									
Female	6.58	0.25	0.61	3.17	0.01	0.91	3.67	1.51	0.22
Male	6.42			3.14			3.15		
Education									
Primary	7.06	1.28	0.27	2.60	1.44	0.23	3.15	1.59	0.19
Vocational	6.37			3.41			3.83		
Secondary	6.60			3.36			3.62		
University degree	6.00			2.74			2.52		
Place of residence									
Urban area	6.53	0.28	0.83	3.14	1.60	0.18	3.53	0.89	0.44
Rural area	6.34			3.37			3.21		
Type of work									
Physical	6.67	0.64	0.42	3.06	0.11	0.73	3.66	5.20	0.02
Clerical	6.34			3.19			2.57		
Character of work									
Sedentary	6.57	0.36	0.83	2.93	0.36	0.83	2.87	0.65	0.62
Standing	6.49			3.57			3.40		
In Motion	6.50			2.97			3.60		

The statistical analysis did not confirm the hypothesis that sex, age, place of residence, education, occupational status, or type of work would individually influence the experience of pain before and after surgery for spinal disease. The only factor that proved to affect patient perception of pain at 6 months after the surgical procedure was type of occupation. The patients who had a physical job complained of much higher level of pain (M=3.66) than the clerical workers (M=2.57). The variability of the results was comparable in both groups and the difference between the groups was statistically significant (H=5.20; p=0.0225). The remaining elements under analysis did not exert a statistically significant influence on patient level of pain.

Regression analysis of individual measurements in the context of all determinants

Apart from the impact analysis of particular factors presented above, it is also crucial to discuss the results of measurements in light of interaction between individual variables (Table 5).

The preoperative assessment did not indicate any marked influence of the factors accounted for in the study on the level of pain (R2=0.11). Of all the factors, age and place of residence were considered to have the most significant influence on the way the patients perceived pain. It represented a statistical trend in which older people living in larger cities tend to experience more severe pain.

The influence of the determinants was similar at 7 days after the procedure (R2=0.09). The impact of age on the perception of pain remained strong and was statistically significant, but the importance of place of residence diminished.

The significance of the factors under analysis slightly increased at the third assessment (R2=0.14). The influence of patient occupational status and type of job on pain level was statistically significant and can be regarded as a statistical trend. Clerical workers tended to experience considerably milder pain than the physical workers. Similarly, patients who were

Indexed in: [Current Contents/Clinical Medicine] [SCI Expanded] [ISI Alerting System] [ISI Journals Master List] [Index Medicus/MEDLINE] [EMBASE/Excerpta Medica] [Chemical Abstracts/CAS] [Index Copernicus]

Table 5. Summary of the multiple regression of pain variable in the analyzed period of time.

Assessment 1.						
	b*	SE - z b*	b	SE - z b	t(124)	p
Offset			2.620109	7.737023	0.33865	0.735449
Age	0.178222	0.102376	0.040896	0.023492	1.74085	0.084190
Place of residence	0.184131	0.094550	0.336731	0.172910	1.94744	0.053742
Assessment 2.						
	b*	SE – z b*	b	SE – z b	t(124)	p
Offset			–0.209179	7.561608	–0.02766	0.977975
Age	0.212299	0.103288	0.047191	0.022959	2.05541	0.041939
Assessment 3.						
	b*	SE – z b*	b	SE – z b	t(96)	p
Offset			6.97998	8.991280	0.77631	0.439477
Occupationalstatus	–0.207528	0.106328	–0.96718	0.495536	–1.95178	0.053879

professionally active declared a markedly higher level of pain that the unemployed.

Discussion

In 70–90% of cases, as the literature suggests, conventional surgical treatment of intervertebral hernia provides good results [18,19]. One of the criteria for the evaluation of the procedure's efficacy is subjective assessment of pain. It seems that the VAS scale used in this study is the best, fastest, and most reliable method of pain assessment and proves useful both before and after the operation, as it is sensitive enough to be used in assessment of treatment efficacy in both periods [20].

The available literature suggests that approximately 30% of patients declare experiencing pain after the treatment and thus regard the operation as unsuccessful [21,22]. The material presented in this study indicates that the back pain level in the entire group regressed from 6.5 points before the operation to 3.1 points at 7 days after the procedure. Understandably, observation needs to be continued and the present results should be treated only as a preliminary point of reference. Nevertheless, the results obtained after 6 months (3.5 points) tend to be comparable and suggest a steady improvement. This dependency applies not only to the time of measurement, but also the diagnosis. Other authors noted a similar decrease in pain level: from 6.0 to 2.7 points [23], from 5.7 to 2.5 points [24], from 7.2 to 2.1 points [25], and from 8.4 to 2.1 points [26]. Long-term observations showed that patients operated on because of their pain experienced better results immediately after the procedure *vs.* longer-term [27,28]. One may argue that the efficacy of the therapy used should be evaluated against the background of pain removal and improvement in patient functioning or the progress in motor skills disorder [29].

Nearly half of the interviewees (47.3%) experienced the first symptoms of back pain from 1 to 5 years before the operation. Jankowski [30] observed that 37% of interviewees struggle with this condition for over 1 year. Swedish surveys regarding the experience of first back pain symptoms revealed that in most cases it occurred between 3 and 12 months before the operation, and 10% of interviewees reported having endured the pain for over 2 years [31]. In contrast, Lee [19] observed that patients tended to experience pain for up to 66 weeks before the procedure. Long-term leg pain prior to the surgery may lead to chronic pain and thus is an adverse prognostic factor [32,33]. Ng [32] argues that patients who had sciatic neuralgia for more than 12 months tended to have worse postoperative results.

The analysis of other clinical factors revealed that only the protrusion or prolapse of the nucleus pulposus determined patient pain; the highest level of perceived pain was in patients who were diagnosed with left-sided hernia, and it occurred in the preoperative period. As indicated by Fagan [34], spinal motion segment lesion caused by a disc hernia leads to inflammation, which in turn activates nociceptors responsible for pain sensation. The available literature mentions other factors that predispose to pain occurrence in these conditions, such as obesity [35], duration of the acute phase (the best results tend to be obtained with patients whose acute phase did not

Indexed in: [Current Contents/Clinical Medicine] [SCI Expanded] [ISI Alerting System] [ISI Journals Master List] [Index Medicus/MEDLINE] [EMBASE/Excerpta Medica] [Chemical Abstracts/CAS] [Index Copernicus]

exceed 3 months [36]), or past history of spine operations [19]. Papadopoulos [37], however, did not find such a relationship.

One of the main risk factors in spine disorders involves occupation, in particular hard physical work, fixed position, weight lifting, and repetitive bending or twisting [38,39]. Consistent with the literature [38,40], the presented group consisted mainly of physical workers (68.43%) whose jobs involved much movement or standing. These patients suffered from the most severe pain.

Patients with spine diseases are predominantly mature. Own study indicated that the largest group (30.9%) consisted of patients aged 40–49 years. The data appear to confirm the other reports [7,18,25,31,41,42]. A significant correlation between the level of pain and patient's age was noted by Radziszewski [43], who observed that young patients had the highest response to analgetics. Pain reduction in patients over the age of 50, on the other hand, tended to be low. As a person ages, lifestyle gradually changes and involutional processes occur, altering biochemical and mechanical features of individual musculoskeletal structures, which may explain the above tendency [1]. Lee [19], however, did not find such correlation between age and the postoperative results. Hyun et al. also did not find any difference in pain perception by age and sex, albeit the work in question involved patients treated with physical therapy [44]. Our own analysis shows that older patients living in larger cities tend to experience higher levels of pain. According to Jarmużek [45], patients from urban areas, both men and women, see more improvement in their condition (32% good results). The study failed to confirm any influence of sex on pain assessment.

It should be noted that scholars tend to put increasingly more emphasis on the role of psychological and psychosocial factors related to the occupational activity of a patient in the assessment of pain after surgical treatment of discopathy.

The complexity of the clinical picture of patients with spine degenerative changes in the form of disc herniation makes it difficult to objectively assess the results of treatment. In the case of such disorders affecting the lumbosacral spine segment, complete pain remission occurred more frequently in patients treated surgically in comparison to conservative treatment [42].

We must highlight the importance of a thorough qualification process that takes into account nerve root pain [46]. The work of Lequin [47] emphasizes that the short-term results are indeed more promising, although after a year after treatment the results of operative and conservative approaches proved to be comparable (23% of patients complained of pain regardless of treatment method employed). Patient age and acute root pain at the initial stage of treatment were deemed to be the predisposing factors [47]. As far as patients with degenerative changes in the cervical segment are concerned, Faldini [48] noticed that up to 75% of patients evaluated the results of treatment as good or excellent. Another study showed that the success rate can be even higher, with 96% of patients reporting improvement [49]. Such promising results may predominantly arise from shorter duration of pain symptoms prior to the procedure, particularly in the context of nerve root pain [50]. Burneikiene [50], on the other hand, argues that conservative treatment also yields good results. Regardless of the approach used, it is of utmost importance that an individual therapeutic treatment plan is devised and followed.

Conclusions

The present study confirmed the efficacy of surgical treatment and its pain-easing effect. Pain reduction occurs soon after the procedure and does not diminish over time. The intensity of pain may depend on isolated factors, such as lateral location of the hernia and type of work performed by the patient.

Because the effect of the above-mentioned factors is not constant (it may change over time), we conclude that in the short-term the preoperative and postoperative level of pain depends mainly on patient age, while in the long-term it may be markedly influenced by occupational status and type of work performed.

Acknowledgments

The authors thank all of the study participants.

Conflict of interests

The authors declare they have no competing interests.

References:

1. Kim PK, Branch ChL: The lumbar degenerative disc: Confusion, mechanics, management. Clin Neurosurg, 2006; 53: 18–25
2. Suratwala SJ, Pinto MR, Gilbert TJ et al: Functional and radiological outcomes of 360 degrees fusion of three or more motion levels in the lumbar spine for degenerative disc disease. Spine, 2009; 34: E351–58
3. Bibby SR, Yu J, Urban JP: The physiology of intervertebral disc degeneration. In: Ginzburg R, Szpalski M, Andersson G (eds.), Degenerative Disc Disease. Philadelphia, Lippincott Williams & Wilkins, 2004; 23–34
4. Styczyński T. [Progress in the treatment for osteoarthritis of the spine.] Reumatology, 2013; 51: 429–36 [in Polish]
5. Poureisa M, Daghighi MH, Mesbahi S et al: End plate disproportion and degenerative disc disease: C case-control study. Asian Spine J, 2014; 8: 405–11
6. Gullick DW: Acute non – specific back pain management in the emergency setting: A review of the literature. Australes Emg Nurs J, 2008; 11: 13–19

Indexed in: [Current Contents/Clinical Medicine] [SCI Expanded] [ISI Alerting System] [ISI Journals Master List] [Index Medicus/MEDLINE] [EMBASE/Excerpta Medica] [Chemical Abstracts/CAS] [Index Copernicus]

7. Manchikanti L, Manchikanti KN, Cash KA et al: Age – related prevalence of facet-joint involvement in chronic neck and low back pain. Pain Physician, 2008; 11: 67–75
8. Manek NJ, Mac Gregor AJ: Epidemiology of back disorders: Prevalence, risk factors, and prognosis. Curr Opin Rheumatol, 2005; 17: 134–40
9. Taher F, Essig D, Lebl DR et al: Lumbar degenerative disc disease: Current and future concepts of diagnosis and management. Adv Orthop, 2012; 2012: 970752
10. Bruns D, Disorbio JM: Assessment of biopsychosocial risk factors for medical treatment: A collaborative approach. J Clin Psychol Med Settings, 2009; 2: 127–47
11. Katz JN: Lumbar disc disorders and low-back pain: Socioeconomic factors and consequences. J Bone Joint Surg Am, 2006; 88(Suppl. 2): 21–24
12. Pappou IP, Cammisa FP, Girardi FP: Correlation of end plate shape on MRI and disc degeneration in surgically treated patients with degenerative disc disease and herniated nucleus pulpo sus. Spine J, 2007; 7: 32–38
13. Pyskło B, Styczyński T, Gasik R: [Causes of back pain's recurrences in surgically treatment patients with lumbar disc hernias.] Reumatology, 2008; 46: 125–29 [in Polish]
14. Yoshihara H, Yoneoka D: National trends in the surgical treatment for lumbar degenerative disc disease: United States, 2000 to 2009. Spine J, 2015; 15: 265–71
15. Zieger M, Luppa M, Meisel HJ et al: The impact of psychiatric comorbidity on the return to work in patients undergoing herniated disc surgery. J Occup Rehabil, 2011; 21: 54–65
16. Glidewell L, Thomas R, MacLennan G et al: Do incentives, reminders or reduced burden improve healthcare professional response rates in postal questionnaires? two randomised controlled trials. BMC Health Serv Res, 2012; 12: 250
17. Manniche C, Asmussen K, Lauritens B: Low back pain rating scale: Validation of a tool for assessment of low back pain. Pain, 1994; 57: 317–26
18. Kohlboeck G, Greimel KV, Piotrowski WP et al: Prognosis of multifactorial outcome in lumbar discectomy: A prospective longitudinal study investigating patients with disc prolapse. Clin J Pain, 2004; 20: 455–61
19. Lee JC, Kim MS, Shin BJ: An analysis of the prognostic factors affecting the clinical outcomes of conventional lumbar open discectomy: clinical and radiological prognostic factors. Asian Spine J, 2010; 4: 23–31
20. Mannion AF, Balagué F, Pellisé F: Pain measurement in patients with low back pain. Nat Clin Pract Rheumatol, 2007; 3: 610–18
21. Strömqvist B, Fritzell P, Hägg O, Jönsson B: One-year report from the Swedish national spine register. Swedish society of spinal surgeons. Acta Orthop Suppl, 2005; 76: 1–24
22. Yorimitsu E, Chiba K, Toyama Y, Hirabayashi K: Long-term outcomes of standard discectomy for lumbar disc herniation: A follow-up study of more than 10 years. Spine, 2001; 26: 652–57
23. Godlewski B, Grochal M, Jekimov R et al: [Evaluation of outcome after surgical treatment of cervical disc disease with Dero C – Disc Peek cages.] Neurol Neurochir Pol, 2007; 41: 417–26 [in Polish]
24. Dewin CB, Provencher MT, Riffenburgh RH et al: The outcomes of lumbar microdiscectomy in a young, active population: correlation by herniation type and level. Spine, 2008; 33: 33–38
25. Ryang YM, Oertel MF, Mayfrank L et al: Standard open microdiscectomy versus minimal access trocar microdiscectomy: Results of a prospective randomised study. Neurosurgery, 2008; 62: 174–82
26. Sharma MK, Chichanovskaya LV, Shlemsky VA, Petrukhina E: A comprehensive study of outcome after lumber discectomy for lumbar degenerative spine disease at 6 months post-operative period. The Open Neurosurgery Journal, 2013; 6: 1–5
27. Selkowitz DM, Kulig K, Poppert EM et al.: The immediate and long-term effects of exercise and patient education on physical, functional, and quality-of-life outcome measures after single-level lumbar microdiscectomy: A randomized controlled trial protocol. BMC Musculoskelet Disord, 2006; 25: 70
28. Peul WC, van Houwelingen HC, van den Hout WB et al: Surgery versus prolonged conservative treatment for sciatica. N Engl J Med, 2007; 31: 2245–56
29. Szulc P, Wendt M, Waszak M et al: Impact of McKenzie method therapy enriched by muscular energy techniques on subjective and objective parameters related to spine function in patients with chronic low back pain. Med Sci Monit, 2015; 21: 2918–32
30. Jankowski R, Blok T, Piestrzeniewicz R et al: [The indication for surgical treatment and the results of intervertebral disc disease of lumbosacral segment.] Neuroskop, 2003; 1: 43–50 [in Polish]
31. Strömqvist F, Ahmad M, Hildingsson Ch et al: Gender differences in lumbar disc herniation surgery. Acta Orthop, 2008; 79: 643–49
32. Ng LC, Sell P: Predictive value of the duration of sciatica for lumbar discectomy. A prospective cohort study. J Bone Joint Surg Br, 2004; 86: 546–49
33. Silverplats K, Lind B, Zoëga B et al: Clinical factors of importance for outcome after lumbar disc herniation surgery: long-term follow-up. Eur Spine J, 2010; 19: 1459–67
34. Fagan A, Moore R, Vernon Roberts B et al: ISSLS prize winner: The innervations of the intervertebral disc: A quantitative analysis. Spine, 2003: 1, 28: 2570–76
35. Park P, Upadhyaya C, Garton HJ, Foley KT: The impact of minimally invasive spine surgery on perioperative complications in overweight or obese patients. Neurosurgery, 2008; 62: 693–99
36. Löbner M, Luppa M, Konnopka A et al: Inpatient or outpatient rehabilitation after herniated disc surgery? – Setting-specific preferences, participation and outcome of rehabilitation. PLoS One, 2014; 5: e89200
37. Papadopoulos EC, Girandii FP, Sandhu HS et al: Outcome of revision discectomies following recurrent lumbar disc herniation. Spine, 2006; 1: 1473–76
38. Rąpała A, Rąpała K, Łukawski S: [Analysis of different constitutional, clinical, radiographic factors of 160 patients with low back pain based on own studies, observations and literature.] Chir Narzadow Ruchu Ortop Pol, 2006; 71: 5–9 [in Polish]
39. Miyamoto M, Konno S, Gembun Y et al: Epidemiological study of low back pain and occupational risk factors among taxi drivers. Ind Health, 2008; 46: 112–17
40. Puolakka K, Ylinen J, Neva MH et al: Risk factors back pain-related loss of work time after surgery for lumbar disc herniation: A 5-year follow-up study. Eur Spine J, 2008; 17: 386–92
41. Jansson KA, Németh G, Granath F, Blomqvist P: Surgery for herniation of a lumbar disc in Sweden between 1987 and 1999. An analysis of 27576 operations. J Bone Joint Surg Br, 2004; 86: 841–47
42. Häkkinen A, Kautiainen H, Järvenpää S et al: Changes in the total Oswestry Index and its ten items in females and males pre- and post-surgery for lumbar disc herniation: A 1-year follow-up. Eur Spine J, 2007; 16: 347–52
43. Radziszewski KR: [Comparative retrospective analysis of pain afflictions in patients with lumbar discopathy receiving conservative or operative therapies.] Pol Merkur Lekarski, 2006; 21: 335–40 [in Polish]
44. Rhee HS, Kim YH, Sung PS: A randomized controlled trial to determine the effect of spinal stabilization exercise intervention based on pain level and standing balance differences in patients with low back pain. Med Sci Monit, 2012; 18(3): CR174–81
45. Jarmużek P, Owoc A, Wdowiak L: Spinal disorders as a social problem. II. The length of acute phase and the course of a disease. Pol J Public Health, 2004; 114: 474–77 [in Polish]
46. Gibson JNA: Surgery for disc disease. BMJ, 2007; 335: 949
47. Lequin MB, Verbaan D, Jacobs W et al: Surgery versus prolonged conservative treatment for sciatica: 5-year results of a randomised controlled trial. BMJ Open, 2013; 3: e002534
48. Faldini C, Leonetti D, Nanni M et al: Cervical disc herniation and cervical spondylosis surgically treated by Cloward procedure: A 10-year minimum follow-up study. J Orthop Traumatol, 2010; 11: 99–103
49. Palma L, Mariottini A, Carangelo B et al: Favourable long-term clinical outcome after anterior cervical discectomy. A study on a series of 125 patients undergoing surgery a mean of 11 years earlier. Acta Neurochir (Wien), 2010; 152: 1145–52
50. Burneikiene S, Nelson EL, Mason A et al: The duration of symptoms and clinical outcomes in patients undergoing anterior cervical discectomy and fusion for degenerative disc disease and radiculopathy. Spine J, 2015; 15: 427–32

Indexed in: [Current Contents/Clinical Medicine] [SCI Expanded] [ISI Alerting System] [ISI Journals Master List] [Index Medicus/MEDLINE] [EMBASE/Excerpta Medica] [Chemical Abstracts/CAS] [Index Copernicus]