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Original Scientific Paper

THE INFLUENCE OF DIFFERENT MINIMALLY INVASIVE METHODS ON THE OUTCOME OF LUMBAR RADICULAR PAIN TREATMENT

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SUMMARY – Lumbar radicular pain is a major public health, social and economic problem and is often the cause of professional disability. The aim of this study was to compare pain intensity, disability and neuropatic pain depending on the method of treatment (epidural steroid injection or percutaneous laser disc decompression) in the treatment of lumbar radicular pain caused by intervertebral disc herniation with or without discoradicular contact. Data were collected from 28 patients at 3 measurement points (before the procedure and at examinations on the 15th and 30th day after the procedure) using the Numeric Rating Scale (NRS), Oswestry Disabilitiy Indeks (ODI) and Pain Detect. The reduction of the pain after the procedure was statistically significant only in the group of patients with discoradicular contact in whom PLDD was performed (P=0.04). From the obtained results, it can be concluded that percutaneous laser disc decompression (PLDD) led to a greater reduction in disability (P=0.009) in patients with discorradicular contact, whereas lumbar transforaminal epidural steroid injection (ESI TF) led to greater reduction in patients without discorradicular contact (P=0.02). The results indicate that there was a significant (P=0.01) reduction in neuropathic pain in patients without discorradicular contact who were treated with ESI TF and in patients with discoradicular contact who were treated with PLDD (P=0.04).

Key words: *herniated disc; epidural injection; percutaneous diskectomy; laser, lower back pain; radiculopathy*

Introduction

Lumbar radicular pain is pain in the lumbar spine that spreads to the lower extremities. Today, it represents a major public health, social and economic issue and is one of the most common reasons why patients consult a doctor. Lumbar radicular pain is often the cause of professional disability and can have consequences on the patient's psychological state. The modern, sedentary lifestyle, excess body weight and lack of physical activity have led to an increase in the incidence of lumbar radicular pain. It is estimated that around 70-85% of the world's population experiences pain in the lumbar spine at least once during their lifetime[1]. Untreated or inadequately treated acute pain turns into chronic pain. The most common cause of

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lumbar radicular pain is a herniated intervertebral disc with or without pressure on the nerve root, which leads to a local inflammatory process and pain[2]. Radicular pain can be unilateral or bilateral. The most common mechanism of pain is direct pressure on the nerve root and a local inflammatory process triggered by a herniated intervertebral disc.

Rheumatic and degenerative diseases are more common in older patients, while the most common cause in younger people is spine overload, improper posture and genetic predisposition. All of the above causes, as well as the loss of the extracellular matrix, lead to the weakening of the annulus fibrosus, which results in herniation of the intervertebral disc. Neuroradiological studies have shown that about 90% of lumbar radicular pain is related to disc disorders[3,4]. Just as the mechanical component is important in the etiology of lumbar radicular pain, so is the inflammatory component[5,6]. Excessive mechanical loading of the intervertebral disc leads to a local inflammatory response, which favors further damage to the disc, thus creating a closed vicious circle[7]. Numerous pro-inflammatory and anti-inflammatory proteins have been found in serum, cerebrospinal fluid and disc biopsies from patients with lumbar radicular pain[8-10]. Treatment of lumbar radicular pain includes pharmacotherapy, physical therapy, minimally invasive treatment and surgery[11]. Opioid analgesics are also used for the treatment of severe pain, which are effective but can cause side effects in some patients[12].

In order to avoid systemic and unwanted effects of analgesics and surgery, minimally invasive procedures have been increasingly used in the treatment of lumbar radicular pain. Epidural transforaminal steroid injection (ESI) and percutaneous laser disc decompression (PLDD) are some of these methods[13-16]. Due to the lack of similar research, the aim of this study was compare the effectiveness of ESI and PLDD in the treatment of lumbar radicular pain caused by intervertebral disc herniation and investigate the difference in the effectiveness of these methods depending on whether there was discoradicular contact or not, based on pain intensity, disability and neuropatic pain.

Methods

The study was a randomized controlled trial conducted at the Clinic for Anesthesiology, Reanimatology and Intensive Medicine in the Pain Management Department of the Clinical Hospital Center Osijek after obtaining the approval of the Clinical Hospital Center Osijek Ethics Committee. The study was conducted on 28 patients. All patients received a written informed consent form and a verbal explanation of the study. After signing the informed consent form, the patients were divided into 4 groups. Patients were divided depending on the presence or absence of disc herniation and nerve contact, and then further divided within each group according to treatment method (ESI or PLDD). All patients were selected at the Pain Management Department of Clinical Hospital Center Osijek. Inclusion criteria were lumbar pain with unilateral radicular pain, MR-confirmed intervertebral disc herniation, patient age between 18 and 65 years and single-level disc herniation. Exclusion criteria were: patients younger than 18 and older than 65 years, patients with systemic infection or local infection in the lumbosacral area, patients with other neurological diseases that lead to muscle weakness and pain in lower extremities, disc extrusion, patients with a reduced disc height of more than 1/3 and earlier surgery at the affected level. The following data were collected: age, gender and MRI findings., pain intensity (NRS) was assessed and patients filled out the Oswestry disability indeks (ODI) and Pain Detect before the procedure and at examinations on the 15th and 30th day after the procedure.

Ethics

The ethical committee of Clinical Hospital Center Osijek approved this study. The study was conducted in accordance with the Declaration of Helsinki. All patients were informed about its purpose and aim and they gave informed consent to participate in the research on a voluntary basis. The anonymity of the patients was guaranteed.

Statistics

Categorical data are represented by absolute frequencies. Categorical differences variables were tested with Fisher's exact test. Numerical data are described by the median and

the limits of the interquartile range. The normality of the distribution of numerical variables was tested

using the Shapiro-Wilk test. Differences in numerical variables between groups were tested by Mann

by Whitney's U test and within each group by Friedman's test. All P values were two-sided. The significance level was set at $\alpha<0.05$. For statistical analysis, we used the statistical program MedCalcStatistical Software version 18.2.1.

Results

The study was conducted on 28 patients, of which ESI was performed in 18/28 patients, while PLDD was performed in 10/28 patients. There were 19/28 female and 9/28 male patients. In 15/28 patients, there was contact of the intervertebral disc with nerve root, while in there was no contact 13/28 there was no contact. The most affected segment was L5/S1 in 14/28 patients, followed by L4/L5 in 12/28 patients (Table 1).

The central value (median) of the age of the patients was 45 years (interquartile range from 37 to 55) (Table 2).

In the group of patients with contact between the intervertebral disc and the nerve root in whom PLDD was performed, the pain was statistically significantly lower at the third measurement, median 5 (interquartile range 1.5 to 6) (Friedman test, P=0.04). There were no statistically significant differences between the ESI and PLDD groups either in the group without or with contact of the intervertebral disc with the nerve root (Table 3).

Total score indicated a decrease in neuropathic pain from the first to the third measurement in both groups. In the group of patients without contact of the intervertebral disc with the nerve root in whom ESI was administered, there was a significant reduction in neuropathic pain (P=0.01), as well as in the group of patients with contact of the intervertebral disc with the nerve root in whom PLDD was performed (P=0.04).

There was no significant difference in neuropathic pain between the two methods in the groups regarding the contact of the intervertebral disc and the nerve root (Table 4).

In the group of patients without intervertebral disc contact with the nerve root who received ESI, disabil-

Table 1. Patient characteristics

	Number/total of patients			P*
	ESI	PLDD	Total	
Gender				
Male	6/18	3/10	9/28	>0.99
Female	12/18	7/10	19/28	
Contact of the intervertebral disc with the nerve root				
Yes	9/18	4/10	13/28	0.71
No	9/18	6/10	15/28	
Segment				
L2-L3	1/18	0	1/28	>0.99
L3-L4	1/18	0	1/28	
L4-L5	7/18	5/10	12/28	
L5-S1	9/18	5/10	14/28	

*Fisher's exact test; † ESI – Epidural Steroid Injection, PLDD – Percutaneous Laser Disc Decompression

Table 2. Age of patients

	Number/total of patients			P*
	ESI	PLDD	Total	
Age of patients (years)	48 (39-56)	41 (36-51)	45 (37-55)	0.20

*Mann Whitney U test

Table 3. Assessment of pain in the groups without and with contact of the intervertebral disc with the nerve root according to the treatment method

	Median (interquartile range) of current pain					P‡
	ESI†	P*	PLDD†	P*	Total	
Without contact between the intervertebral disc and the nerve root						
1st measurement	6 (5.0-75)	0.31	7 (5.5-7.5)	0,73	6 (5 - 7,5)	0.69
2nd measurement	4 (2.5-6.0)		5 (4.0-7.0)		5 (3 - 7)	0.24
3rd measurement	5 (1.5-6.5)		7 (5.0-7.5)		6 (2,5 - 7)	0.24
With contact between the intervertebral disc and the nerve root						
1st measurement	7 (4.75-7.75)	0.37	8 (5.3-8.3)	**0,04**	7 (6-8)	0.34
2nd measurement	7 (4.0-8.5)		5 (4.3-6.5)		5 (5-7)	0.76
3rd measurement	7 (3.25-7.75)		5 (1.5-6.0)		5 (5-7)	0.22

*Friedman's test; † ESI – Epidural Steroid Injection, PLDD – Percutaneous Laser Disc Decompression; ‡Mann Whitney U test

Table 4. Neuropathic pain depending on the method and contact between the intervertebral disc and the nerve root

	Median (interquartile range) of total neuropathic pain					P‡
	ESI†	P*	PLDD†	P*	Total	
Without contact between the intervertebral disc and the nerve root						
1st measurement	20 (15-24.5)	**0.01**	21 (12.5-27.3)	0.76	20 (15-26)	0.88
2nd measurement	18 (12.5-21)		21 (14.0-25.8)		18 (13-23)	0.49
3rd measurement	16 (13-22)		19.5 (8.0-26.5)		17 (13-23)	0.47
With contact between the intervertebral disc and the nerve root						
1st measurement	22 (13.5-25.5)	0.09	20.5 (15.3-26.3)	**0.04**	22 (17-25)	0.91
2nd measurement	23 (13.5-25.5)		16.5 (10.5-20.8)		20 (11-23)	0.19
3rd measurement	21 (13-24)		16 (6.5-19.75)		21 (7-21)	0.47

*Friedman's test; † ESI – Epidural Steroid Injection, PLDD – Percutaneous Laser Disc Decompression; ‡Mann Whitney U test

Table 5. Oswestry Disability Index (ODI) values according to the method and contact between intervertebral disc and the nerve root

	Median (interquartile range) of the Oswestry Disability Index					P‡
	ESI†	P*	PLDD†	P*	Total	
Without contact between the intervertebral disc and the nerve root						
1st measurement	23 (17-30)	**0.02**	24.5 (18.5-30.5)	0.07	18.5 (34-23)	0.69
2nd measurement	17 (11.5-28.0)		22.5 (18.8-30.0)		15 (32-18)	0.19
3rd measurement	18 (15.5-24.0)		17 (14.8-26.8)		15.5 (32-17)	0.76
With contact between the intervertebral disc and the nerve root						
1st measurement	22 (18-29)	0.15	31 (23.8-34.8)	**0.009**	19 (38-25)	0.09
2nd measurement	19 (15-27)		20.5 (16.5-25.8)		17 (38-19)	0.81
3rd measurement	21 (14-28)		16.5 (10.5-25.8)		13 (38-20)	0.49

*Friedman's test; † ESI – Epidural Steroid Injection, PLDD – Percutaneous Laser Disc Decompression; ‡Mann Whitney U test

ity was significantly reduced at the third measurement, with a median of 18 (interquartile range 15.5 to 24) (P=0.02).

The group of patients with intervertebral disc contact with the nerve root in whom PLDD was applied had a reduction in disability ranging from 31 (interquartile range 23.8 to 34.8) at the first measurement to a median of 16.5 (interquartile range 10.5 to 25.8) at the third measurement (Friedman test, P=0.009). There were no significant differences between the two methods (Table 5).

Discussion

Currently, no studies have compared the effectiveness of the ESI and PLDD methods or their effectiveness depending on discoradicular contact. The hypotheses of this study were based on previous knowledge and the knowledge on the mechanism of action of each of these methods.

Epidural steroid injection using a transforaminal approach and percutaneous laser disc decompression are effective methods for treating lumbar radicular pain caused by intervertebral disc herniation[17,18].

We assumed that both methods would be equally effective in the treatment of herniated intervertebral disc without discoradicular contact at the follow-up examination one month after the procedure, while PLDD would be more effective in the treatment of patients with discorradicular contact.

Lumbar radicular pain most often affects people engaging in work strenuous for the back. The median age of the patients in this study was 45 years (interquartile range from 37 to 55).

The reduction of the pain after the procedure was statistically significant only in the group of patients with discoradicular contact in whom PLDD was performed (P=0.04), while the pain reduction was lower in patients without discoradicular contact in whom PLDD was performed (P=0.73). These results indicate that the dominant mechanism of PLDD is the decompression of the nerve root in relation to the reduction of local inflammation.

In the group of patients who underwent ESI, there was no statistically significant reduction in the pain. The obtained results do not correlate with the results of other studies, where success, which is defined by pain reduction by more than 50%, was achieved in 63% of patients after one month[17].

The presence of a neuropathic pain was evaluated with the Pain Detect questionnaire. The results indicate that there was a significant reduction in neuropathic pain in patients without discorradicular contact who were treated with ESI, which was in accordance with the hypothesis. In patients without discoradicular contact in whom PLDD was applied, there was no significant reduction in neuropathic pain, which was not in accordance with the hypothesis that ESI and PLDD would be equally effective in this group of patients, and it is possible that the reason for this was the small number of patients.

There was no statistically significant reduction in neuropathic pain in the group of patients with discoradicular contact who underwent ESI, (P=0.09), while there was a significant reduction in neuropathic pain in patients who underwent PLDD. The results were in accordance with the hypothesis. Other authors have also demonstrated that ESI is effective not only in reducing nociceptive but also neuropathic pain[19]. The shortcoming of these studies is that they did not compare the effect depending on whether there was discorradicular contact or not.

The degree of disability was assessed using the Oswestry Disability Index (ODI) questionnaire. The disability questionnaire includes the following items: pain intensity, personal care, lifting, walking, sitting, standing, sleeping, traveling and sexual and social life.

Patients who underwent ESI and who did not have discoradicular contact had significantly reduced disabilities according to ODI at the third measurement, in contrast to patients who had discoradicular contact, which was in accordance with the hypothesis.

Patients who underwent PLDD and who had discoradicular contact on the third measurement had a significant reduction in disability. Patients who underwent PLDD and did not have disc-radicular contact had a reduction in disability close to statistical significance. From the obtained results, it can be concluded that PLDD led to a greater reduction in disability in patients with discorradicular contact and ESI TF led to a greater reduction in patients without discorradicular contact. The effects of ESI were already visible at the follow-up examination on the 15th day after the procedure, which is a result of the rapid action of local anesthetic followed by corticosteroids, while the effect of PLDD was significant after 30 days, which is in line with other research. Ren et al. found that the improvement after PLDD increases from 45% after one month to 65% after 3 months[18].

In the study conducted by Hashemi et al., there was also a significant reduction in pain intensity and degree of disability in patients who underwent PLDD in the treatment of lumbar pain caused by intervertebral disc protrusion[20].

The results showed that the reduction of pain was not statistically significant in three groups of patients, whereas the results were better when measuring neuropathic pain and disability. Although no statistical correlation was established between these data, relatively high pain intensities despite the reduction of neuropathic pain and disability could be related to the influence of the subjective assessment of pain intensity.

This was a pilot study to determine if there was a difference in efficacy between ESI TF and PLDD in the treatment of patients with lumbar radicular pain, as well as if there was a difference depending on whether discorradicular contact was present or not. In order to obtain as uniform a group of patients as possible, patients with unilateral lumbar radicular pain caused by herniation of the intervertebral disc at one level were included. Given the small sample size and the partial confirmation of the set hypotheses, future research should include a larger number of patients and an increase in the number of observed variables.

References

1. Hoy D, March L, Brooks P, Blyth F, Woolf A, Bain C, et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. Ann Rheum Dis. 2014 Jun;73(6):968-74. doi: 10.1136/annrheumdis-2013-204428.
2. Khan AN, Jacobsen HE, Khan J, Filippi CG, Levine M, Lehman RA Jr, et al. Inflammatory biomarkers of low back pain and disc degeneration: a review. Ann N Y Acad Sci. 2017 Dec;1410(1):68-84. doi: 10.1111/nyas.13551.
3. Porchet F, Wietlisbach V, Burnand B, Daeppen K, Villemure JG, Vader JP. Relationship between severity of lumbar disc disease and disability scores in sciatica patients. Neurosurgery. 2002 Jun;50(6):1253-9; discussion 1259-60. doi: 10.1097/00006123-200206000-00014.
4. Leiden-The Hague Spine Intervention Prognostic Study Group; El Barzouhi A, Vleggeert-Lankamp CL, Nijeholt GJ LÀ, Van der Kallen BF, van den Hout WB, Jacobs WC, et al. Magnetic resonance imaging in follow-up assessment of sciatica. N Engl J Med. 2013;368(11):999-1007.
5. Khan AN, Jacobsen HE, Khan J, Filippi CG, Levine M, Lehman RA Jr, et al. Inflammatory biomarkers of low back pain and disc degeneration: a review. Ann N Y Acad Sci. 2017 Dec;1410(1):68-84. doi: 10.1111/nyas.13551.
6. Wuertz K, Haglund L. Inflammatory mediators in intervertebral disk degeneration and discogenic pain. Global Spine J. 2013 Jun;3(3):175-84. doi: 10.1055/s-0033-1347299.
7. Adams MA, Roughley PJ. What is intervertebral disc degeneration, and what causes it? Spine (Phila Pa 1976). 2006 Aug 15;31(18):2151-61. doi: 10.1097/01.brs.0000231761.73859.2c.
8. Wuertz K, Haglund L. Inflammatory mediators in intervertebral disk degeneration and discogenic pain. Global Spine J. 2013 Jun;3(3):175-84. doi: 10.1055/s-0033-1347299.
9. Jungen MJ, Ter Meulen BC, van Osch T, Weinstein HC, Ostelo RWJG. Inflammatory biomarkers in patients with sciatica: a systematic review. BMC Musculoskelet Disord. 2019 Apr 9;20(1):156. doi: 10.1186/s12891-019-2541-0.
10. Kraychete DC, Sakata RK, Issy AM, Bacellar O, Santos-Jesus R, Carvalho EM. Serum cytokine levels in patients with chronic low back pain due to herniated disc: analytical cross-sectional study. Sao Paulo Med J. 2010;128(5):259-62. doi: 10.1590/s1516-31802010000500003.
11. Patel VB, Wasserman R, Imani F. Interventional Therapies for Chronic Low Back Pain: A Focused Review (Efficacy and Outcomes). Anesth Pain Med. 2015 Aug 22;5(4):e29716. doi: 10.5812/aapm.29716.
12. Harris JD. Management of expected and unexpected opioid-related side effects. Clin J Pain. 2008 May;24 Suppl 10:S8-S13. doi: 10.1097/AJP.0b013e31816b58eb.
13. Momenzadeh S, Koosha A, Kazempoor Monfared M, Bairami J, Zali A, Ommi D, et al. The Effect of Percutaneous Laser Disc Decompression on Reducing Pain and Disability in Patients With Lumbar Disc Herniation. J Lasers Med Sci. 2019 Winter;10(1):29-32. doi: 10.15171/jlms.2019.04.
14. Schneider B, Zheng P, Mattie R, Kennedy DJ. Safety of epidural steroid injections. Expert Opin Drug Saf. 2016 Aug;15(8):1031-9. doi: 10.1080/14740338.2016.1184246.
15. Choy DS. Percutaneous laser disc decompression. J Clin Laser Med Surg. 1995 Jun;13(3):125-6. doi: 10.1089/clm.1995.13.125.
16. Rados I, Sakic K, Fingler M, Kapural L. Efficacy of interlaminar vs transforaminal epidural steroid injection for the treatment of chronic unilateral radicular pain: prospective, randomized study. Pain Med. 2011 Sep;12(9):1316-21. doi: 10.1111/j.1526-4637.2011.01213.x.
17. Smith CC, McCormick ZL, Mattie R, MacVicar J, Duszynski B, Stojanovic MP. The Effectiveness of Lumbar Transforaminal Injection of Steroid for the Treatment of Radicular Pain: A Comprehensive Review of the Published Data. Pain Med. 2020 Mar 1;21(3):472-87. doi: 10.1093/pm/pnz160.
18. Ren L, Guo H, Zhang T, Han Z, Zhang L, Zeng Y. Efficacy evaluation of percutaneous laser disc decompression in the treatment of lumbar disc herniation. Photomed Laser Surg. 2013 Apr;31(4):174-8. doi: 10.1089/pho.2012.3402.
19. Sencan S, Celenlioglu AE, Yazici G, Gunduz OH. Transforaminal Epidural Steroid Injection Improves Neuropathic Pain in Lumbar Radiculopathy: A Prospective, Clinical Study. Neurol India. 2021 Jul-Aug;69(4):910-915. doi: 10.4103/0028-3886.323894.
20. Hashemi M, Falsafi M, Razzaghi MR, Dadkhah P, Taheri M, Delshad MH, et al. The Long-term Effects of Percutaneous Laser Disc Decompression (PLDD) Treatment on Lumbar Disc Protrusion: A 2-Year Follow-up. J Lasers Med Sci. 2020 Fall;11(4):427-32. doi: 10.34172/jlms.2020.67.

Sažetak

UTJECAJ RAZLIČITIH MINIMALNO INVAZIVNIH METODA NA ISHOD LIJEČENJA LUMBALNE RADIKULARNE BOLI

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Lumbalna radikularna bol je veliki javnozdravstveni, društveni i ekonomski problem i često je uzrok profesionalne nesposobnosti. Cilj ovog istraživanja bio je usporediti intenzitet boli, onesposobljenost i neuropatsku bol ovisno o načinu liječenja (epiduralna injekcija steroida ili perkutana laserska dekompresija diska) u liječenju lumbalne radikularne boli uzrokovane hernijom intervertebralnog diska sa ili bez diskoradikularnog kontakta. Podaci su prikupljeni od 28 pacijenata u 3 točke mjerenja (prije zahvata i na pregledima 15. i 30. dana nakon zahvata) pomoću Numeric Rating Scale (NRS), Oswestry Disabilitiy Indeks (ODI) i Pain Detect. Smanjenje boli nakon zahvata bilo je statistički značajno samo u skupini bolesnika s diskoradikularnim kontaktom kod kojih je učinjen PLDD (p = 0,04). Iz dobivenih rezultata može se zaključiti da je PLDD doveo do većeg smanjenja onesposobljenosti (p = 0,009) u bolesnika s diskoradikularnim kontaktom a ESI u bolesnika bez diskoradikularnog kontakta (p = 0,02). Rezultati pokazuju da je došlo do značajnog (p = 0,01) smanjenja neuropatske boli u bolesnika bez diskoradikularnog kontakta koji su liječeni ESI i u bolesnika s diskoradikularnim kontaktom koji su liječeni PLDD (p = 0,04).

Ključne riječi: *hernija diska, epiduralna injekcija, perkutana diskektomija, laser, lumbalna bol, radikulopatija*