Evaluation of Anxiety and Depression Levels in Patients with Lumbar Disc Herniation Operated with Microdiscectomy

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Abstract

Aim: Studies examining the effect of microdiscectomy and surgical treatment on the psychiatric complaints of patients with lumbar disc herniation are new and few. Although the international literature reports that depression and anxiety decrease in the long term after microdiscectomy, we observed that these complaints were resolved much earlier in our clinical practice. We aimed to determine depression, anxiety, and pain levels in the preoperative period and in the first month postoperatively with validated scales for the documentation of these observations.

Method: After eliminating patients with comorbid pathologies that may affect pain and psychiatric factors, pain levels in 31 patients with lumbar disc herniation were evaluated with the Visual Analog Scale (VAS) and depression and anxiety levels were evaluated with the Hospital Anxiety and Depression (HAD) scale. Statistical comparisons were made with the Student-T test in NCSS (2020, Utah, USA).

Results: It was observed that the low back and leg pain scores improved significantly after microdiscectomy, and the preoperative anxiety and depression scores were widely distributed, but both were significantly reduced in the postoperative period.

Conclusion: The decrease in depression and anxiety levels after microdiscectomy earlier than international observations can be explained by the higher surgical anxiety in the Turkish population and the higher correlation between mood and pain levels. Since pain and psychiatric complaints have the feature of increasing each other, more successful management of these factors by clinicians will contribute to more effective treatments.

Keywords: Lumbar disc herniation, microdiscectomy, depression, anxiety, pain.

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ETHICAL STATEMENT: This retrospective study was designed in accordance with the ethical standards of the institutional responsible committee and the 1975 Declaration of Helsinki, revised in 2000. Ethical approval was obtained from the institutional ethics committee of Memorial Bahçelievler Hospital (Istanbul, Turkey) (04/11/2023 approval number: 94).

Mikrodiskektomi ile Opere Edilen Lomber Disk Hernili Hastalarda Anksiyete ve Depresyon Düzeylerinin Değerlendirilmesi

Öz

Amaç: Lomber disk hernisi olan hastalarda mikrodiskektomi ve cerrahi tedavinin psikiyatrik şikayetler üzerine etkisini inceleyen çalışmalar yeni ve az sayıdadır. Uluslararası literatürde mikrodiskektomi sonrası depresyon ve anksiyetenin uzun dönemde azaldığı bildirilse de biz klinik pratiğimizde bu şikayetlerin çok daha erken düzeldiğini gözlemledik. Bu gözlemlerin bilimsel dokümantasyonu için preoperatif dönemde ve postoperatif birinci ayda depresyon, anksiyete ve ağrı düzeylerinin valide edilmiş ölçeklerle belirlenmesi amaçlandı.

Yöntem: Ağrıyı etkileyebilecek komorbid patolojiler ve psikiyatrik faktörler elendikten sonra lomber disk hernisi olan 31 hastanın ağrı düzeyleri Visual Analog Scale (VAS) ile depresyon ve anksiyete düzeyleri Hospital Anxiety and Depression (HAD) ölçeği ile değerlendirildi. İstatistiksel analizler NCSS programında (2020, Utah, ABD) Student-T testi ile uygulandı.

Bulgular: Mikrodiskektomi sonrası bel ve bacak ağrısı skorlarının anlamlı olarak düzeldiği, preoperatif anksiyete ve depresyon skorlarının geniş dağılım gösterdiği ancak postoperatif dönemde her ikisinin de anlamlı olarak azaldığı görüldü.

Sonuç: Mikrodiskektomi sonrası depresyon ve anksiyete düzeyindeki düşüşün uluslararası gözlemlerden daha erken olması, Türk popülasyonunda cerrahi kaygının daha yüksek olması ve ruh hali ile ağrı düzeyleri arasındaki ilişkinin daha yüksek olması ile açıklanabilir. Ağrı ve psikiyatrik şikayetler birbirini artırma özelliğine sahip olduğundan bu faktörlerin klinisyenler tarafından daha başarılı yönetilmesi daha etkili tedavilere katkı sağlayacaktır.

Anahtar Sözcükler: Lomber disk hernisi, mikrodiskektomi, depresyon, anksiyete, ağrı.

Introduction

Low back pain is among the most common causes of disability and work loss, and lumbar disc hernias are among the most common causes of this pain. Lumbar disc herniation and chronic pain also cause psychiatric complaints. Surgical treatment with microdiscectomy has been proven to improve disability and quality of life. However, studies examining the effects of microdiscectomy on psychiatric complaints are new and limited. In one of early studies, the effects of microdiscectomy on depression, somatization and mental well-being in patients with lumbar disc herniation were examined[1]. Hundred patients who underwent discectomy for a single level lumbar hernia were evaluated in the preoperative period and at the 6th week and 3rd, 6th and 12th months postoperatively, and pain, depression and somatic perception were determined. Low back and leg pain were measured with the Visual Analogue Scale (VAS), depression with the Zung Self-Assessment Depression Scale, and somatic anxiety with the Modified Somatic Perception Questionnaire. It was observed that the pain improved in the sixth week, but the improvement in somatic anxiety and depression occurred in the 3rd and 12th months[1]. Since we observed that the

psychiatric complaints improved rapidly in our practice, we evaluated the pain, depression and anxiety levels before and after microdiscectomy in patients with single-level lumbar disc hernia in the early period. For this purpose, we applied the Hospital Anxiety and Depression Scale (HAD), which was developed by Zigmond and Snaith in 1983 and has been shown to be valid and reliable[2]. The validity and reliability of the Turkish version of this scale was reported by Aydemir et al[3].

Material and Methods

Study Design

This retrospective study was designed in accordance with the ethical standards of the institutional responsible committee and the 1975 Declaration of Helsinki, revised in 2000. Ethical approval was obtained from the institutional ethics committee of Memorial Bahçelievler Hospital (Istanbul, Turkey) (04/11/2023 approval number: 94). All patients signed informed consent forms for participation in the study. Pain severity was determined by VAS scores. The study included adult patients whose radiological features of single-level lumbar disc herniation correlated with lumbar radicular pain. All patients had radicular leg pain without spinal stenosis seen on magnetic resonance imaging. Pain-related exclusion criteria were defined as neurological disorders (such as cauda equina syndrome), infections, other lumbar spine pathologies, including primary spinal tumors and metastases, and other osteological and muscular diseases associated with pain. As psychiatric exclusion criteria, clinically diagnosed psychiatric diseases, cognitive diseases (such as Alzheimer's, advanced Parkinson's), terminal patients, and susceptible population patients (such as prisoners) were determined. Thirty-one adult patients (age range 22-69 years old), 19 male and 12 female, who met these criteria were included in the study.

Clinical Evaluation

Demographic factors (age, gender), clinical complaints, muscle strength level in clinical examination, disc herniation side and levels, preoperative and postoperative pain levels for the waist and leg, and total depression and anxiety scores determined by the HAD scale were recorded. VAS measurements, which determine the level of pain, are an assessment in which patients define their pain levels between 0 and 10 severity levels with their own feelings. Muscle strength measurements were evaluated between 0/5 and 5/5 by clinical examination. If there is muscle power loss of different intensities in different muscles (such as the extensor hallucis longus and anterior tibialis) affected by the disc herniation, the maximum muscle power loss was taken into account. HAD, which is a self-report scale covering anxiety and depression assessments, includes a total of 14 questions, seven of which assess depression and seven assess anxiety. Responses are rated on a four-point Likert scale, and each response is scored between 0 and 3 points. Therefore, the highest and lowest scores that can be obtained for both depression and anxiety are between 0 and 21. Scores from these scales are defined as normal between 0 and 7,

between 8 and 10 as borderline, and above 11 as abnormal. Before the HAD scale questionnaires were applied, the physician who carried out the primary follow-up informed the patients about the questionnaire and stated that patient privacy would be respected. Measurements of pain, depression, and anxiety were made in each patient before surgery and one month after microdiscectomy.

Surgical Procedure

The senior author of this study performed all surgical procedures at a single center with ethical consent. Single level simple lumbar microdiscectomy was performed in all patients. Partial hemilaminectomy plus flavectomy and root decompression with foraminotomy under surgical microscopy, followed by microdiscectomy, were performed.

Statistical Analysis

Descriptive statistical methods (percentage, median, mean, standard deviation) were used to evaluate the study data, and preoperative and postoperative VAS, anxiety and depression scores were compared using the Student-T test with NCSS program (2020, Utah, USA). Statistical significance level was determined as $p<0.05$.

Results

The demographic and anatomical characteristics of the patients in our cohort are summarized in Table 1.

Table 1. Demographic and anatomic features of patients

Demographic & Anatomic Features		**n (%)**
Gender	**Male**	19 (61.3)
	Female	12 (38.7)
Age	*Mean±Std (years)*	44.3±12.1
	Median (Range)	45 (22-69)
Side	**Right**	12 (38.7)
	Left	19 (61.3)
Level	**L1-L2**	1 (3.2)
	L2-L3	-
	L3-L4	-
	L4-L5	16 (51.6)
	L5-S1	14 (45.2)
Motor Strength	**0/5**	-
	1/5	2 (6.5)
	2/5	1 (3.2)
	3/5	4 (12.9)
	4/5	21 (67.7)
	5/5	3 (9.7)

The study included 19 men and 12 women, aged between 22 and 69 (median: 45). Low back pain was found in all patients, and leg pain at the same side of the disc herniation was found in all patients (not shown in the table). Lumbar disc herniation was located on the right side in 12 patients and on the left side in 19 patients. While there were no L2-L3 and L3-L4 level patients in our cohort, it was observed that the patients were mostly L4-L5 and L5-S1 level patients. No total motor deficit was observed in 3 patients, and the muscle strength of most of the patients was observed at the level of 4/5. Disc herniation was observed as extruded in 16 patients, protruded in 6 patients, migrated up or down in 1 and 2 patients, and far lateral in 1 patient (not shown in the table).

The distribution of patients according to normal, borderline, and abnormal preoperative depression and anxiety scores is shown in Table 2.

Table 2. Distribution of patient numbers and percentages according to normal, borderline and abnormal preoperative depression and anxiety scores

Preoperative Patient Features	**Normal Scores 0-7**	**Borderline Scores 8-10**	**Abnormal Scores 11 and above**
Patient Number and Percentages Regarding Depression Scores	2 (6.5%)	8 (25.8%)	21 (67.7%)
Patient Number and Percentages Regarding Anxiety Scores	2 (6.5%)	5 (16.1%)	24 (%77.4%)

The effects of microdiscectomy on pain, depression, and anxiety are summarized in Table 3.

Table 3. Effects of microdiscectomy on pain, anxiety and depression levels. STD: Standard deviation

Effects of Microdiscectomy		**Preoperative**	**Postoperative**	**Significance**
Pain Level				
Low back	Median (Range)	8 (7-10)	2 (0-4)	P<0.0001
	Mean±STD	8.26±1.01	1.94±1.44	
Leg	Median (Range)	9 (7-10)	1 (0-3)	P<0.0001
	Mean±STD	9±0.88	1.32±0.98	
Anxiety Scores	Median (Range)	13 (4-20)	1.5 (0-9)	P<0.0001
	Mean±STD	13.45±1.02	2.0±2.23	
Depression Scores	Median (Range)	12 (4-19)	4 (1-6)	P<0.0001
	Mean±STD	12.42±3.36	3.74±1.44	

While the median low back pain score was 8 (range: 7-10) in the preoperative period, this value decreased to 2 (range: 0-4) in the postoperative period. The difference between preoperative and postoperative low back pain scores was highly significant ($p<0.0001$). While the median score of leg pain was 9 (range: 7-10) in the preoperative period, this value decreased to 1 (range: 0-3) in the postoperative period. The difference between preoperative and postoperative leg pain scores was highly significant ($p<0.0001$). While the median level of anxiety score was 13 (range: 4-20) in the preoperative period, this value decreased to 1.5 (range: 0-9) in the postoperative period. The difference between preoperative and postoperative anxiety scores was found to be highly significant ($p<0.0001$). While the median level of depression score was 12 (range: 4-19) in the preoperative period, this value decreased to 4 (range: 1-6) in the postoperative period. The difference between preoperative and postoperative depression scores was highly significant ($p<0.0001$).

Discussion

Our general observations are consistent with the known factors that lumbosacral disc herniation is more common in men and is more common at L4-L5 and L5-S1 levels. The absence of a patient with a total weakness in muscle strength can be attributed to the fact that the patients were operated on due to severe pain before the motor deficit progressed. As expected, microdiscectomy significantly reduced back and leg pain. Back pain is associated with psychiatric health depending on its severity and duration, as depression has been reported in up to 65 percent of patients with chronic pain[4,5]. This relationship is due to the fact that pain triggers the physiological pathways responsible for depression, as well as interacting with less tolerance to pain in people with depression. In 148 patients with chronic low back and radicular leg pain, disability was measured with the Rolland and Morris questionnaire and depression was measured with the Beck Depression Inventory before discectomy and 6 and 12 months after surgery. Preoperative high depression and disability scores were significantly reduced after surgery[4]. In another study, pre- and postoperative quality of life, depression, pain disability, disability in daily activities were determined by EQ-5D, PHQ-9, PDQ questionnaires and Rankin scores in patients who underwent lumbar microdiscectomy or decompression. In both surgical groups, improvement in quality of life and depression, and improvements in Rankin scores and PDQ scores were noted in most patients[6].

In an investigation examining longitudinal depression and anxiety in 350 disc surgery patients compared to the general population, depression and anxiety were measured with the HAD scale[7]. Measurements were evaluated intraoperatively (T0), three months (T1), and nine months after surgery (T2). It was found that the rates of depression were 23.6% (T0), 9.6% (T1) and 13.1% (T2), respectively; and the rate of depression only in T0 was different from the general population. The rates of anxiety were 23.7% (T0), 10.9% (T1) and 11.1% (T2), respectively. The anxiety level was found to be higher in all three periods compared to the general population[7]. The reason for the

high level of anxiety in this patient group in the late period may be due to concerns about the recurrence of the disease and the need for reoperation. An exercise study randomized 30 lumbar hernia patients who underwent microdiscectomy into two groups, 15 for follow-up and 15 for 12-week exercise in the postoperative period[8]. The home exercise program included pelvic tilt, abdominal exercises, isometric quadriceps, and thigh extensor strengthening exercises. Exercising and non-exercising patients were evaluated in terms of lumbar disability (ODI - Oswestry Disability Index), pain severity (VAS), and depression (Beck Depression Scale). There was a statistically significant decrease in the ODI value after exercise, a significant decrease in VAS scores, and no change in depression scores[8]. This can be explained by a process when improvements occur first in disability, then in pain, and finally in depression. It is also established that the decrease in depression is directly related to the well-being of the patients in long term. When the The Spine Patient Outcomes Research Trial (SPORT) data were analyzed, it was seen that the decrease in disability rates with both conservative and surgical treatment of disc herniation patients was correlated with the decrease in depression[9]. Jabłońska et al. observed preoperative depressive symptoms in 47.3% of 188 disc patients with 140 lumbar and 44 cervical disc herniation. It was noted that this rate was higher in lumbar disc patients, decreased in the early postoperative period (mostly in lumbar disc patients), and increased again in lumbar disc patients in the sixth month[5]. Based on these findings, it can be proposed that the symptomatology of lumbar disc hernia is more related to emotional factors.

In this study, although the measurements were made in the early period, post-surgical anxiety and depression scores decreased very significantly. The difference between our findings and international studies reporting that these complaints decrease in the late period can be explained by the fact that the anxiety about surgery is higher in the Turkish population and the mood changes are more dependent on the severity of pain. The wide distribution of preoperative depression and anxiety scores in our study group and the fact that the majority of the patients were found in the abnormal score range support this hypothesis. However, larger patient groups and longitudinal evaluations are needed to prove this proposal. Psychiatric factors may increase somatic complaints, as pain causes psychiatric complaints in patients with disc herniation. For example, anxiety level influenced pain intensity, disease duration, and quality of life in 145 patients with lumbar disc herniation treated with endoscopic discectomy[10]. Since psychiatric complaints can increase pain severity and reduce treatment success, it is important for clinicians to recognize these factors. The limitations of our current study are its retrospective nature, the relatively small number of patients, and the subjective nature of the VAS questionnaires. The strengths of our study are the reduction of the emotional effects that may arise from different physician-patient relationships with the application of the questionnaires in a single center, and the obtaining of data from a homogeneous population with rigorous exclusion criteria.

Conclusion

Management of psychiatric complaints is important in every disease, and more so in patients with chronic pain. The contribution of a psychologist or a liaison psychiatrist according to the severity of the symptoms may be beneficial, especially in the rehabilitation of patients who complain that their pain does not decrease after successful surgery.

REFERENCES

1. Lebow R, Parker SL, Adogwa O, et al. Microdiscectomy improves pain-associated depression, somatic anxiety, and mental well-being in patients with herniated lumbar disc. *Neurosurgery*. 2012;70(2):306-11.
2. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand*. 1983;67(6):361-70.
3. Aydemir Ö, Güvenir T, Küey L, Kültür S. Hastane anksiyete ve depresyon ölçeği Türkçe formunun geçerlilik ve güvenilirlik çalışması. *Türk Psikiyatri Dergisi*. 1997;8(4):280-87.
4. Farzanegan G, Alghasi M, Safari S, Ahmadi SA. Effects of lumbar discectomy on disability and depression in patients with chronic low back pain. *Anesth Pain Med*. 2011;1(1):20-4.
5. Jabłońska R, Ślusarz R, Królikowska A, Haor B, Antczak A, Szewczyk M. Depression, social factors, and pain perception before and after surgery for lumbar and cervical degenerative vertebral disc disease. *J Pain Res*. 2017;10:89-99.
6. Tharin S, Mayer E, Krishnaney A. Lumbar microdiscectomy and lumbar decompression improve functional outcomes and depression scores. *Evid Based Spine Care J*. 2012;3(4):65-6.
7. Löbner M, Luppa M, Matschinger H, et al. The course of depression and anxiety in patients undergoing disc surgery: A longitudinal observational study. *J Psychosom Res*. 2012;72(3):185-94.
8. Ozkara GO, Ozgen M, Ozkara E, Armagan O, Arslantas A, Atasoy MA. Effectiveness of physical therapy and rehabilitation programs starting immediately after lumbar disc surgery. *Turk Neurosurg*. 2015;25(3):372-9.
9. Koerner JD, Glaser J, Radcliff K. Which variables are associated with patient-reported outcomes after discectomy? Review of SPORT disc herniation studies. *Clin Orthop Relat Res*. 2015;473(6):2000-6.
10. Shi S, Zhou Z, Ni HJ, et al. Does anxiety influence the prognosis of percutaneous transforaminal endoscopic discectomy in the treatment of lumbar disc herniation? A preliminary propensity score matching analysis. *Int Orthop*. 2020;44(11):2357-2363.