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Research Article

Examination of Pain, Quality of Life, Disability, and Anxiety in Patients Undergoing Lumbar Disc Surgery with and without COVID-19

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Abstract

Aim: This study aims to examine pain, disability, anxiety, and quality of life in patients undergoing lumbar disc herniation (LDH) surgery with and without COVID-19.

Material and Method: Eighty patients who were diagnosed with LDH and planned surgery between March and September 2023 were included in the study. 50% of the patients were diagnosed with COVID-19 for at most six months, according to the positive polymerase chain reaction (PCR) test. 50% of the patients had no symptoms of COVID-19, ranging from mild to severe, and the PCR test was negative (-). The patients' pain level, disability, anxiety, and quality of life were evaluated and compared between the groups with and without COVID.

Results: The mean scores of physical roles, physical function, mental health, body pain, and social function on the SF-36 quality of life scale in the LDH+COVID-19 (+) patient group were significantly lower than those in LDH+COVID-19 (-) ($p<0.05$). Additionally, a statistically significant difference was observed between pain, anxiety, and disability levels in favor of the LDH+COVID-19 (+) patient group ($p<0.05$).

Conclusion: Patients with COVID-19 undergoing LDH surgery have poor quality of life with high levels of anxiety, pain, and disability. Therefore, it is important to consider the current results during the postoperative rehabilitation process.

Keywords: Lumbar disc, COVID-19, anxiety, quality of life, pain

INTRODUCTION

Low back pain is a problem that affects approximately 80% of people at some point in their lives (1). Various factors cause this situation. However, low back pain due to degenerative joint and disc disease is relatively less common (2). Lumbar disc herniation (LDH) is a pathology characterized by a change in the discs' normal position due to discs' overload during the degeneration process (3,4). Mechanical and inflammatory processes are considered important factors in forming low back pain (5). Incorrect movements, overload, or physical inactivity also affect the load-bearing capacity of the spine and cause disc lesions (4,5). Irritation and inflammation resulting from compression of peripheral nerves between intervertebral discs following disc lesions is the accepted theory for the origin of pain (6,7).

During the COVID-19 epidemic, many precautions were taken to control it. Social isolation has also increased due to travel restrictions and compliance with interpersonal distance rules. As a result, there has been an increase in loneliness rates, and this has led to the deterioration of both mental and physical health worldwide (8,9). When pain is evaluated from a biopsychological perspective, loneliness and isolation are the most well-known causes of pain exacerbation among psychosocial factors (10). Studies report that an increase in loneliness and social isolation may be associated with high levels of pain (10-12). There has been an increase in psychological stress rates due to increased loneliness and social isolation in the COVID-19 epidemic, and this has triggered pain,

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leading to an effective potential in individuals with chronic pain (11,12). When the literature is examined, it has also been shown that patients' quality of life after COVID-19 is seriously affected (13,14).

Studies have shown that increased social isolation because of COVID-19 measures may be associated with psychological stress, pain, and quality of life (10-14). This situation also results in physical inactivity and increases problems such as low back pain (11). Additionally, it may increase LDH symptoms. However, when the literature is examined, there is no direct evidence of a relationship between psychosocial factors after LDH surgery and a history of COVID-19 infection. Our hypothesis in our study is that there may be an increase in the degree of disability and pain symptoms after COVID-19 infection in patients who underwent LDH surgery. In this context, this study aims to compare the pain, quality of life levels, disability and anxiety of patients who underwent LDH surgery according to their COVID-19 infection status.

MATERIAL AND METHOD

This cross-sectional study included patients scheduled for LDH surgery referred to the neurosurgery outpatient clinic of Karabük University Training and Research Hospital between March 2022 and September 2023. Forty female and forty male patients were included in the study. Patients whose diagnosis of intervertebral disc pathology was confirmed by MRI after evaluation by a neurosurgeon who was over 18 years of age and who volunteered to participate in the study were included. Additionally, patients who had or had not had COVID in the last six months, according to the positive polymerase chain reaction test, were included in the study. Patients who were pregnant, had lumbar degenerative changes (spondylolisthesis, scoliosis, malignancy, vertebral fracture, osteoporosis, lumbar osteoarthritis, etc.) in the MRI report, had other musculoskeletal diseases in addition to low back pain, had fibromyalgia, and had a primary psychiatric disease were excluded from the study.

The number of individuals to participate in the study was determined by the G*Power program. According to the pain results of the pilot study, it was determined that the sample size would have 80% power with at least 39 people in each group for an effect size of α=0.05 and d=0.641. The University Ethics Committee gave its approval, (2023-1293), and the study was carried out in accordance with the Declaration of Helsinki. Participants gave informed consent to participate voluntarily before participating in the study.

Patients who met the inclusion criteria were asked to answer the survey face-to-face. Through the questionnaire, patients' age, gender, height, weight, duration of symptoms, affected side, etc., information was recorded. Then, the patients were divided into two groups according to whether they had COVID before LDH surgery. During the clinical follow-up period after LDH surgery, the recovery process of the patients was evaluated one month later during the follow-up. Patients' pain levels were evaluated with the Visual Analog Scale (VAS), their quality of life with the Short Form-36 Quality of Life Scale (SF-36), their disability levels with the Oswestry Disability Index (ODI), and their anxiety levels with the Beck Anxiety Inventory (BAI).

Data Collection tools

Pain severity

The severity of low back pain the patients experienced during their daily activities was evaluated with VAS. VAS consists of a 0-10 cm line, and the patient is asked to mark their pain level. As the score increases, the pain intensity increases (5).

Quality of life

The patient's quality of life was evaluated using SF-36. SF-36 appraises quality of life across eight domains and 36 items. These domains are physical function, social functioning, body pain, physical limitations, emotional limitations, energy/fatigue, general health perception, and mental health. The scale score ranges from 0 to 100, and an increase in score indicates an increase in quality of life (15).

Disability

ODI was used to evaluate the degree of loss of function that occurred with low back pain. The questionnaire consists of 10 items assessing travel, lifting, carrying, pain intensity, walking, sitting, sleep, degree of pain change, standing, self-care, and social life. Each question is scored between "0" and "5". A higher score indicates more disability (16).

Anxiety

The anxiety level of the patients was evaluated with BAI. The scale is a 21-item self-report scale to measure the severity of self-reported anxiety. It is a Likert-type scale scored between 0-3. The total score varies between 0-64, and as the score increases, the anxiety level also increases (17).

Statistical Analysis

SPSS version 25 software was used in the study to conduct statistical analysis. The normal distribution of variables was examined histograms and Kolmogorov-Smirnov. When comparing normally distributed data, Student's t-test was used, while Mann Whitney-U test was employed for data that did not follow normal distribution. The difference between the two groups in terms of these factors was compared using Chi Square or Fischer tests, depending on the situation. P value below 0.05 were considered statistically significant.

RESULTS

Eighty patients diagnosed with LDH and planned for surgery were included in the study. Forty patients

scheduled for LDH surgery had been diagnosed with COVID-19 in the last six months, and the other 40 patients did not have any symptoms. The patients were evaluated at the 1-month follow-up after surgery and divided into two groups: those with COVID and those without. While the average age of patients with LDH who had COVID was 49.1±12.2, the average age of patients with COVID (-) was 49.7±12.9. Sociodemographic information of the groups was similar to each other (p>0.05, Table 1).

It was found that the average physical role, physical function, mental health, body pain and social function scores on the SF-36 of patients participating in the study are statistically lower in the LDH+ COVID-19 (+) patient group than the participants of the LDH+ COVID-19 (-) patient group (Table 2). According to Table 2 and Figure 1, the study found no statistically significant difference in emotional role, vitality, and mean general health perception scores between the two groups. The consecutive p-values for these variables were 0.296, 0.133, and 0.508, respectively, based on the SF-36. Based on the study, the LDH+ COVID-19 (+) patients had a higher BAI, VAS, and ODI score compared to the LDH+ COVID-19 (-) patients (p<0.05).

Table 1. Evaluation of demographic characteristics of participants according to groups

		Group		
		LDH+COVID (-)	LDH+COVID (+)	p
Sex, n (%)	**Female**	21 (52.5)	19 (47.5)	0.823
	Male	19 (47.5)	21 (52.5)	
Marital status, n (%)	**Married**	36 (90)	30 (75)	0.141
	Single	4 (10)	10 (25)	
Dominant hand, n (%)	**Right**	38 (95)	37 (92.5)	1.000
	Left	2 (5)	3 (7.5)	
Smoking status, n (%)	**Smoker**	26 (65)	26 (65)	1.000
	Non smoker	14 (35)	14 (35)	
Occupational status, n (%)	**Housewife**	18 (45)	13 (32.5)	0.415
	Officer	4 (10)	7 (17.5)	
	Employee	16 (40)	15 (37.5)	
	Retired	2 (5)	5 (12.5)	
Educational status, n (%)	**Illiterate**	1 (1.2)	0 (0)	0.584
	Primary school	14 (35)	11 (12.5)	
	High school	19 (47.5)	19 (47.5)	
	University	6 (15)	10 (259	
Lumbar disc level, n (%)	**L1/L2**	0 (0)	0 (0)	0.939
	L2/L3	0 (0)	1 (2.59	
	L3/L4	3 (7.5)	3 (7.59)	
	L4/L5	14 (35)	15 (37.5)	
	L5/S1	23 (57.5)	21 (52.5)	
Chronic diseases, n (%)	**None**	27 (67.5)	32 (80)	0.233
	Diabetes mellitus	10 (25)	4 (10)	
	Heart disease	0 (0)	1 (2.5)	
	Hypertension	3 (7.5)	3 (7.5)	
	Respiratory diseases	0 (0)	0 (0)	
	Other	0 (0)	0 (0)	
Age, X±SD		49.7±12.9	49.1±12.2	0.817
Weight (kg), X±SD		78.6±11.8	78±11.7	0.813
BMI (kg/m²), X±SD		27±2.9	26.7±2.4	0.601

BMI: body mass index, SD: standart deviation

Table 2. Comparison of BAI, ODI, VAS and SF-36 subscales between both groups

	Group	Mean	SD	Min	Max	p
BAI	**LDH+COVID (-)**	11.5	3.3	7	19	**<0.001**
	LDH+COVID (+)	16.4	5.9	7	30	
ODI	**LDH+COVID (-)**	61.5	16.9	28	96	**0.003**
	LDH+COVID (+)	73.3	16.9	42	100	
VAS	**LDH+COVID (-)**	4.4	1.5	2	7	**0.014**
	LDH+COVID (+)	5.3	1.9	2	8	
SF-36						
Role physical	**LDH+COVID (-)**	8.8	21.6	0	100	**0.024**
	LDH+COVID (+)	0.6	4	0	25	
Role emotional	**LDH+COVID (-)**	5	19.3	0	100	0.296
	LDH+COVID (+)	0.8	5.3	0	33.3	
Physical functioning	**LDH+COVID (-)**	40.4	25.8	0	85	**0.003**
	LDH+COVID (+)	22.9	19.5	0	55	
Vitality	**LDH+COVID (-)**	28	10.6	5	45	0.133
	LDH+COVID (+)	24.8	11.4	0	50	
Mental health	**LDH+COVID (-)**	51.3	5.7	32	64	**0.008**
	LDH+COVID (+)	47.7	7.2	32	60	
General health	**LDH+COVID (-)**	40.8	13	15	65	0.508
	LDH+COVID (+)	38.5	15.2	5	65	
Bodily pain	**LDH+COVID (-)**	40.6	14	10	67.5	**<0.001**
	LDH+COVID (+)	23.3	18.3	0	55	
Social functioning	**LDH+COVID (-)**	40.6	14.1	0	62.5	**<0.001**
	LDH+COVID (+)	27.5	16.3	0	50	

BAI: Beck Anxiety Inventory, ODI: Oswestry Disability Index, VAS: Visual Analog Scale, SF-36: Quality of Life-Short Form, SD: standart deviation, LDH: Lumbar Disc Herniation

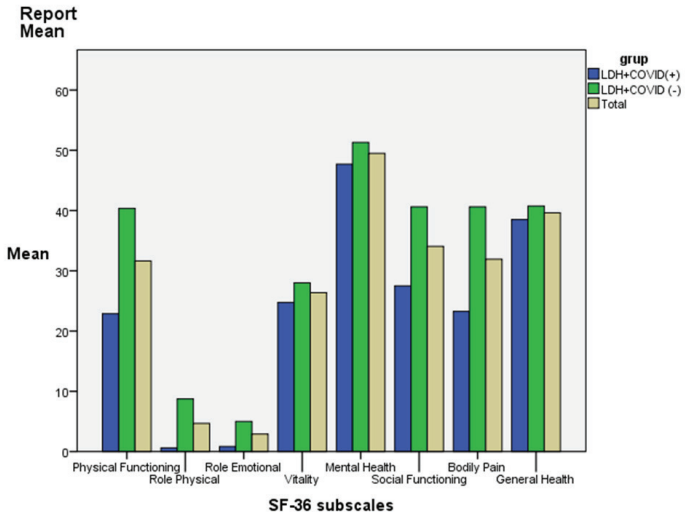

Figure 1. Comparison of the quality of life of LDH Covid-19 (+) and LDH Covid-19 (-) patients. Physical role, physical function, mental health, body pain and social function in the SF-36 quality of life scale of the cases in the LDH + Covid 19 (+) patient group mean score was significantly lower

DISCUSSION

This study determined that disability, anxiety, and pain scores in patients who had LDH surgery and had COVID-19 were significantly higher than in patients without COVID-19. Moreover, the results show that contracting COVID-19 disease plays an important role in the quality of life of patients with LDH.

In addition to common symptoms such as fever, cough, myalgia, and fatigue, musculoskeletal pain can also be an important symptom of COVID-19. Additionally, musculoskeletal disorders associated with COVID-19 may also lead to increased disability in patients (18,19). According to studies, people with COVID-19 infections may experience worsening neck and back pain, which may persist even after the infection is cured (20). Research indicates that during the COVID-19 pandemic, there has been a rise in the prevalence and severity of low back pain in comparison to pre-pandemic levels (18-20). A meta-analysis showed that the intensity of low back pain increased significantly during the COVID-19, and the

decrease in physical activity rate played an important role (21). Present study, similar to the existing literature, it was determined that patients diagnosed with COVID-19 and who underwent LDH surgery had higher pain levels than those who did not have COVID-19. This may have been caused by lifestyle changes, such as a sedentary lifestyle and weight gain, caused by isolation methods taken to reduce the spread of COVID-19 disease.

COVID-19 may lead to radical changes in the living conditions of society due to disease and restrictions, leading to negative physical and psychological consequences (22,23). It has been stated that myalgia is frequently observed in one-quarter of symptomatic COVID-19 patients (24). Anxiety and depression symptoms are more common in patients with low back pain and are thought to be twice as common as in the general population (25). It is also stated that one-third of patients operated on for LDH experience anxiety and depression (26,27). Studies show that anxiety and depression are substantial contributing factors to decreased quality of life in patients undergoing spine surgery (28,29). In this study, it was determined that LDH patients who had COVID-19 had higher anxiety levels than those who did not have COVID-19. When examined, this situation may be due to the permanent symptoms and psychological effects of COVID-19 infection on patients. Therefore, clinicians need to be more careful with LDH patients who have had COVID-19 and have high levels of anxiety in terms of negative surgical outcomes or subsequent maladaptive rehabilitation. Additionally, studies have shown that there is a relationship between preoperative pain, anxiety, and depression (30,31). Inadequate pain management in LDH patients whose psychological risk factors cannot be adequately evaluated may cause chronic pain and lead to increased anxiety and depression.

A person's psychological well-being is negatively impacted, and their quality of life is diminished when they are unable to engage in social and everyday activities due to their illness (32). Previous studies have found that patients with persistent low back pain score lower on quality-of-life measures (33,34). Another study found a correlation between the physical component scores and quality of life in individuals with persistent low back pain (34). In a different study, the quality-of-life scores of one hundred patients with lumbar discopathy who were going to have surgery were shown to be lower than those of healthy volunteers (35). In this study, COVID-19 positive (COVID-19+) LDH patients showed more impairment in their physical role, physical function, mental health, bodily pain, and social function subscale quality of life scores than did COVID-19 negative (COVID-19-) LDH patients. Previous research indicates that COVID-19 has a detrimental impact on patients' quality of life. Furthermore, COVID-19 has been linked to psychological symptoms that impact mental health status, including anxiety, depression, and post-traumatic stress disorder (36). Therefore, the decline in individual functionality brought on by the incapacity to adjust to everyday living activities and social interactions may account for the decline in quality of life observed in COVID-19+ LDH patients in our investigation. Consequently, it may be said that a lower quality of life is caused by both higher pain and decreased mental health.

The connection between patients with persistent low back pain and their avoidance of pain has garnered attention in recent years (36). Patients with persistent low back pain are more disabled when they suffer from psychosocial variables such anxiety, sadness, and pain phobia (38,39). Furthermore, a study found a correlation between pain thresholds and disability (40). The association between pain and incapacity can be explained by psychological states, fear, and self-efficacy. The study found that patients with COVID-19 (+) LDH had considerably higher degrees of impairment. The rise in the disability rate has an impact on this scenario because of the rising levels of dread and anxiety during the pandemic.

CONCLUSION

This study found that patients with COVID-19 (+) LDH had higher levels of anxiety, pain, and disability and poorer quality of life compared to patients without COVID-19. Clinicians must understand the role of social stresses created by pandemic situations such as COVID-19 on quality of life and healthcare utilization. Therefore, the relationship of psychosocial factors with COVID-19 should be considered during the clinical follow-up and rehabilitation process after surgery.

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Ethical approval: *The study was approved by the Karabük University Non-Interventional Clinical Research Ethics Committee (Protocol number: 2023-1293).*

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