Original Article

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Coexistence of Fibromyalgia, Myofascial Pain Syndrome and Depression Among Patients with Lumbar Disc Herniation

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Abstract

Aim: Pain in lumbar disc herniation (LDH) may originate from a multisource other than the intervertebral disc, and magnetic resonance imaging (MRI) findings are not always correlated with clinical symptoms in LDH patients. This study aimed to determine the prevalence of fibromyalgia (FM), myofascial pain syndrome (MPS), and depression in patients with LDH and to evaluate the clinical variations caused by these comorbidities.

Methods: One hundred and fifty-four patients with a diagnosis of LDH confirmed by MRI and admitted to a physical medicine and rehabilitation outpatient clinic between July 2021 and January 2022 were enrolled in this cross-sectional study. Pain intensity was recorded according to the visual analog scale (VAS). The presence of FM and MPS was examined. The Beck Depression Inventory (BDI) was used to research the presence of depression. Patients were divided into three groups: LDH without FM or MPS, LDH+FM, LDH+MPS.

Results: Of the 154 LDH patients, 60 of them had LDH without FM or MPS (38.9%), 52 of them had LDH+FM (33.8%), and 42 of them had LDH+MPS (27.3%). Forty-eight LDH patients (31.2%) had depression. The mean VAS of the FM+LDH group was higher than that of the other two groups ($p<0.001$). Depression was more common in the LDH+FM and LDH+MPS groups than in the LDH without the FM or MPS group ($p<0.001$).

Conclusion: These results indicate that the coexistence of FM, MPS, and depression in LDH patients is frequent, and a multidimensional approach is required for LDH treatment.

Keywords: Low back pain, intervertebral disc herniation, fibromyalgia, myofascial pain syndrome, trigger point, depression

Introduction

Low back pain is a frequent and challenging worldwide health problem and remains the leading global cause of years lived with disability worldwide (1). Emerging data reveals that, although low back pain is often self-limited, some patients experience recurrences and may go on a chronic course (2). Chronic low back pain (CLBP) impacts the daily activities of patients, decreases their quality of life, and results in an important socio-economic problem. 39% of CLBP's pain etiology has been attributed to intervertebral disc diseases (3). Moreover, all degenerated or herniated disks are not associated with pain, and disc degeneration is moderately associated with radiating pain (4). Therefore, it is important to assess the coexistence of other potential pain etiologies in patients with discogenic lower back pain.

Fibromyalgia (FM) is a widespread muscular tenderness illness characterized by tiredness, psychosomatic symptoms, sleep difficulties, headaches, and visceral pain syndromes such as interstitial cystitis and irritable bowel syndrome. Musculoskeletal pain arises in the neck, interscapular area, and low back in

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most FM patients (5). Myofascial trigger points (MTrPs) are hyperirritable, palpable nodules in the skeletal muscle fibers that cause muscular discomfort and stiffness in one or more muscles (6). MTrPs are the cardinal symptoms of myofascial pain syndrome (MPS). The neck, shoulders, and back are the predominant areas for MPS, while there are no standardized diagnostic criteria for MPS, which makes it easy to confuse with other painful conditions (7). Although some studies believe MPS can occur in FM, there is still controversy over whether MPS is a unique clinical entity in FM. The American Pain Society considers MPS a unique clinical entity from FM (8-10).

Pain is a symptom with cognitive, behavioral, emotional, and physical manifestations (11). Psychological symptoms such as sadness, exhaustion, and overload have been related to the existence of low back pain, and these emotions may be linked to the progression of pain chronicity. The combination of lumbar disc herniation (LDH) and depression constitutes a significant health issue that is linked to higher rates of disability, socioeconomic disadvantage, and increased use of healthcare resources (12,13). The presence of FM or MPS in patients with LDH is probably related to increased depression rates. However, the definitiveness of this link has not been well established in the literature.

FM and MPS occur as the primary sources of low back pain and comorbid pain with other conditions. While FM and MPS are commonly observed as painful syndromes in patients with chronic LDH in daily clinical practice, there are a limited number of studies investigating the presence of FM and MPS in patients with CLBP (14,15). Failure to recognize FM or MPS in these patients may lead to over-investigation and unnecessary medical intervention. Thus, this study investigated the presence of concomitant FM and MPS in patients diagnosed with LDH using magnetic resonance imaging (MRI) and to identify the influence of these comorbidities on clinical variables.

Materials and Methods

Compliance with Ethical Standards

Before participating in the study, the evaluations were explained to the patients in detail, and the informed consent form was signed by all participants. This study was approved by Karadeniz Technical University Faculty of Medicine, Scientific Research Ethics Committee (dated: 2021/05/31, and numbered: 2021-133).

Study Design

This cross-sectional study assessed 200 patients with low back pain lasting more than 3 months and diagnosed with LDH confirmed by MRI in the last year. Patient enrollment was performed at the physical medicine and rehabilitation outpatient clinic. The exclusion criteria included patients with features of inflammatory spinal pain or rheumatic disease diagnosis, scoliosis or other structural vertebral deformities, spinal fracture or spinal surgery history, neurological deficit, history of severe psychiatric disease, uncontrolled diabetes mellitus, neurologic disorders such as multiple sclerosis, spinal infectious diseases, malignancy, pregnancy or women who had recent delivery, patients who had previous exercise therapy for their low back pain, use of antidepressant or analgesic drugs (except non-steroidal anti-inflammatory drugs or acetaminophen taken two weeks before the patient evaluation).

The physical examination included a routine neurological examination. Patients with extremity motor dysfunctions, sensory deficits, absent or asymmetrical deep tendon reflexes, or sphincter dysfunctions were excluded from the study. All MRIs were reviewed and patients with bulging disks on MRI were deemed radiologically normal. Consequently, 154 LDH patients were available for the evaluation.

Patient Evaluation

Anamnesis, demographic and clinical properties, and physical examination results were recorded on a case report form. Demographic characteristics involved age, body mass index (BMI), and comorbid diseases.

All patients underwent assessments for pain level, the presence of FM, MPS, and depression. First, pain intensity measurements were performed using a visual analog scale (VAS). Accordingly, in a line of 100 mm, a 0 point was accepted as the absence of pain and a 100 point as the maximum pain. The point between the marked point and point 0 was measured with the help of a ruler (16).

Then, patients were screened to determine the potential diagnosis of FM in accordance with 2016 American College of Rheumatology (ACR) criteria. FM was diagnosed in a patient when all of the following criteria were met: 1) Widespread pain index (WPI) ≥7 and symptom severity scale (SSS) score ≥5 or WPI 4-6 and SSS score ≥9. 2) Pain in at least four of the five body areas is referred to as generalized pain. The WPI uses a 0-19 scale to assess the severity of pain by asking patients if they have experienced pain or tenderness in 19 different body areas (shoulder girdle, hip, jaw, upper arm, upper leg, lower arm, lower leg, upper back, lower back, chest, neck, and abdomen) over the past week, with each painful or tender region scoring 1 point. The 2016 ACR criteria modified SSS as a checklist of 41 symptoms with a somatic symptom score (score range: 0-3) expressing the sum score for three items: the presence or absence of (1) headaches, (2) pain or cramps in the lower abdomen, or (3) depressive symptoms (17).

Patients who did not meet 2016 ACR FM criteria were evaluated for the diagnosis of MPS. The physical examination of MPS was based on muscle palpation. The regional muscles were palpated to reveal the MTrPs. The posterior cervical (splenius capitis and cervicis, semispinalis, and oblique capitis inferior), sternocleidomastoid, levator scapulae, psoas, quadratus lumborum, paraspinal muscles (iliocostalis, longimus thoracis, multifidi), abdominal oblique, and rectus femoris) were defined muscles with trigger points that may reproduce regional pain in the lower back region, which were examined in this study (18).

The most commonly applied criteria for the definition of MPS were used. Simons (19) proposed major and minor criteria for diagnosing MPS, which were later amended by Long and Kephart (20). These four criteria involved the following: (1) tender spot in a taut band of skeletal muscle, (2) patient pain recognition, (3) pain referral pattern prediction, and (4) local twitch response. Active and latent MTrPs were also noted.

The Beck depression inventory (BDI) was used to evaluate the psychological status of the patient population. The BDI consists of a 21-self-reported item scale to assess the current severity of depression symptoms. Each item is evaluated on a four-point scale (0-3) with a total score range of 0 to 63. Depression is indicated by a cut score of 17 or above (21). The Turkish validity and reliability analysis of this scale was performed by Hisli (22).

Additionally, the presence of radicular pain, fatigue, waking unrefreshed, cognitive symptoms, headache, pain, or cramps in the lower abdomen has been recorded. All were examined by the same experienced physician and patients were divided into three groups: patients with only LDH, with LDH and FM, with LDH+MPS, then compared accordingly.

Statistical Analysis

The Statistical Package for the Social Sciences software (23.0 version) (SPSS Inc., Chicago, IL, USA, 2008) was used for the statistical analysis. Qualitative data were represented as number and percentage for categorical variables and were calculated by computing the mean and standard deviation of each variable. The one sample Kolmogorov-Smirnov test was used to determine the normality. Comparisons of numerical variables between two independent groups were evaluated with the Mann-Whitney U test. The Kruskal-Wallis test was used to evaluate non-normal data in the comparison of three dependent groups. The post hoc comparisons were assessed with the Bonferroni test. Pearson's chi-square test was used to compare qualitative data. Differences were considered statistically significant when the p-value<0.05.

Results

In total, 154 LDH patients were included in the analysis. Sixty of them had LDH without FM or MPS (38.9%), 52 of them had LDH+FM (33.8%), and 42 of them had LDH+MPS (27.3%). The mean patient age was 46.0±10.8 with no statistical difference between groups. The mean BMI of all LDH patients was 27.6±4.9, while there was no significant between-group difference in BMI. The comparison of demographic data between the groups is summarized in Table 1.

Sixty-three LDH patients (40.9%) had at least one active trigger point and 43 LDH patients (27.9%) had at least one latent trigger point. The mean VAS in the LDH+FM group was 76.4±15.4 and significantly greater than that of the other groups (p<0.001). The mean WPI score was the highest in the LDH+FM group. The mean BDI scores of the LDH+FM group and LDH+MPS group were statistically

Table 1. Comparison of demographic data between groups

*		LDH without FM or MPS (n=60)	LDH + FM (n=52)	LDH + MPS (n=42)	p	Total (n=154)
Age (years) (mean ± SD)		44.5±10.7	46.3±10.6	47.7±11.0	0.324**	46.0±10.8
Gender (%)	**Female**	31 (51.7)[a]	41 (78.8)[b]	29 (69.0)[a,b]	**0.009*** **	101 (65.6)
	Male	29 (48.3)[a]	11 (21.2)[b]	13 (31.0)[a,b]		53 (34.4)
BMI (kg/m²) (mean ± SD)		27.4±6.2	28.2±3.9	27.0±3.8	0.262**	27.6±4.9
Comorbid diseases n (%)	**Comorbidity**	22 (36.7)[a]	30 (57.7)[a]	15 (35.7)[a]	**0.040*** **	67 (43.5)
	Diabetes	3 (5.0)	7 (13.5)	5 (11.9)	-	15 (9.7)
	Hypertension	13 (21.7)	17 (32.7)	10 (23.8)	-	40 (26.0)
	Thyroid disease	2 (3.3)	4 (7.7)	1 (2.4)	-	7 (4.5)
	Renal disease	4 (6.7)	3 (5.8)	-	-	7 (4.5)
	Cardiac disease	2 (3.3)	6 (11.5)	3 (7.1)	-	11 (7.1)
	Other	3 (5.0)	6 (11.5)	2 (4.8)	-	11 (7.1)

*Different letters **(a,b,c)** within the same row represent significant differences,**One way ANOVA, ***Chi-Square test,****Kruskal Wallis test
SD: Standard deviation, BMI: Body mass index, LDH: Lumbar disc herniation, FM: Fibromyalgia, MPS: Myofascial pain syndrome

similar. However, the mean BDI score of the LDH without the FM or MPS group was the lowest compared to the other two groups (p<0.001). A comparison of clinical features is presented in Table 2.

Cognitive symptoms, pain or cramps in the lower abdomen and depression were more common in the LDH+FM and LDH+MPS groups than in the LDH without the FM or MPS group. Forty-eight of 154 LDH patients (31.2%) had depression according to BDI scores. A comparison of other clinical variables between the groups is shown in Table 3 and Figure 1.

Discussion

The bone-disc complex anatomy and spinal nerves are usually the focus of clinical evaluations of low back pain. Although earlier research has shown that these diagnostic imaging modalities are not necessarily connected with symptom severity, computed tomography or MRI are often used to evaluate patients with low back pain. They may provide erroneous positive or negative results as well as provide relevant information (23).

This study suggests that MTrP is a common clinical entity observed in the LDH patient population. Of all

Table 2. Comparison of back pain duration, VAS, WPI, BDI and number of trigger points between groups

*		LDH without FM or MPS (n=60)	LDH + FM (n=52)	LDH + MPS (n=42)	p**	Total (n=154)
Duration of back pain (months)	mean ± SD	14.4±15.0	16.5±17.4	15.3±16.5	0.882	15.4±16.5
VAS		63.6±14.4[a]	76.4±15.4[b]	64.6±11.5[a]	**<0.001**	68.2±15.1
WPI		4.0±1.9[a]	8.9±2.9[b]	5.0±2.7[a]	**<0.001**	5.9±3.3
BDI		5.5±9.1[a]	17.0±16.7[b]	11.9±9.3[b]	**<0.001**	11.1±13.2
Number of active trigger points		0.2±0.9[a]	2.9±4.4[b]	3.9±3.4[c]	**<0.001**	2.1±3.5
Number of latent trigger points		0.3±0.7[a]	0.9±1.5[b]	1.1±2.0[b]	**0.009**	0.7±1.4

*Different letters (a,b,c) within the same row represent significant differences,**Kruskal-Wallis test
VAS: Visual analog scale, WPI: Widespread pain index, BDI: Beck depression inventory LDH: Lumbar disc herniation, FM: Fibromyalgia, MPS: Myofascial pain syndrome, SD: Standard deviation

Table 3. Comparison of clinical features between groups

*		LDH without FM or MPS (n=60)	LDH + FM (n=52)	LDH + MPS (n=42)	p**	Total (n=154)
		n (%)	n (%)	n (%)		n (%)
Level of LDH	**L1-L2**	4 (6.7)	6 (11.5)	-	-	10 (6.5)
	L2-L3	12 (20.0)[a]	5 (9.6)[a,b]	1 (2.4)[b]	0.021	18 (11.7)
	L3-L4	19 (31.7)	20 (38.5)	8 (19.0)	0.123	47 (30.5)
	L4-L5	32 (53.3)	24 (46.2)	29 (69.0)	0.080	85 (55.2)
	L5-S1	28 (46.7)	18 (34.6)	16 (38.1)	0.408	62 (40.3)
Radicular pain		16 (26.7)	13 (25.0)	12 (28.6)	0.927	41 (26.6)
Presence of active trigger points		3 (5.0)[a]	21 (40.4)[b]	39 (92.9)[c]	<0.001	63 (40.9)
Presence of latent trigger points		9 (15.0)[a]	19 (36.5)[b]	15 (35.7)[b]	0.017	43 (27.9)
Fatigue		34 (56.7)	34 (65.4)	29 (69.0)	0.403	97 (63.0)
Waking unfreshed		30 (50.0)	32 (61.5)	30 (71.4)	0.090	92 (59.7)
Cognitive symptoms		8 (13.3)[a]	24 (46.2)[b]	20 (47.6)[b]	<0.001	52 (33.8)
Headache		17 (28.3)[a]	31 (59.6)[b]	18 (42.9)[a,b]	0.004	66 (42.9)
Pain or cramps in lower abdomen		8 (13.3)[a]	18 (34.6)[b]	15 (35.7)[b]	0.012	41 (26.6)
Depression (BDI ≥17)		6 (10.0)[a]	22 (42.3)[b]	20 (47.6)[b]	<0.001	48 (31.2)
FM		-	-	-	-	52 (33.8)
MPS		-	-	-	-	42 (27.3)

*Different letters **(a,b,c)** within the same row represent significant differences, **Chi-square test
LDH: Lumbar disc herniation, FM: Fibromyalgia, MPS: Myofascial pain syndrome, BDI: Beck depression inventory

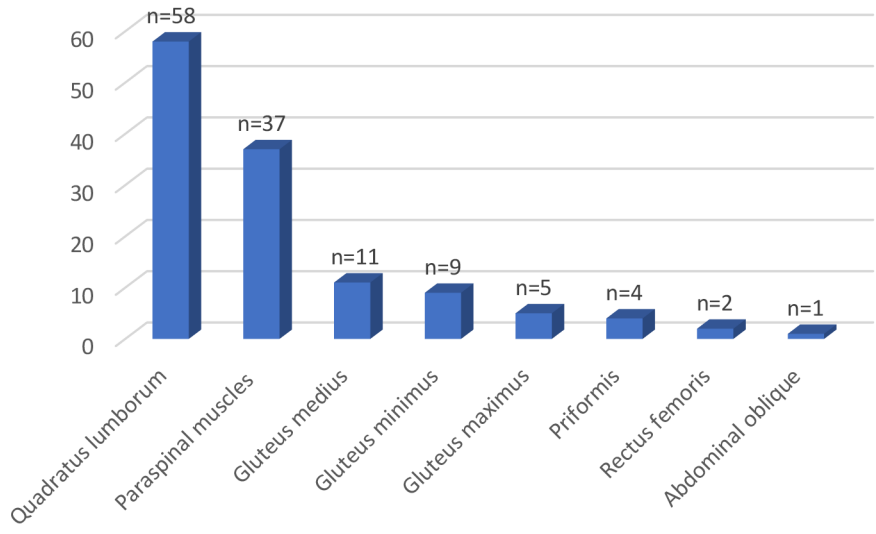

Figure 1. Distrubution of trigger point muscles in lumbar disc herniation patients

LDH patients, 68.8% presented with MTrP, and the most frequent MTrPs were determined in the quadratus lumborum and paraspinal muscles. According to an earlier study, more than 90% of low back pain patients with no objective abnormalities had MTrPs, and nearly 60% of CLBP patients were identified as having regional pain syndromes (24). Rozhkov et al. (25) determined a 52% rate of MPS in female patients with CLBP, while 27.3% of our patient population had concomitant LDH and MPS. Hoeritzauer et al. (26) stated that over half of the patients with low back pain had nerve root compression, which may have contributed but did not explain their clinical presentation.

FM and MPS have been suggested as probable overlapping problems in lumbar disc illnesses as well as alternate origins of low back pain (27,28). Many individuals with concurrent or isolated FM or MPS are diagnosed with only LDH based on MRI results. However, FM and MPS have comparable clinical symptoms with LDH and one condition may hide the other. In line with previous studies, we observed a high incidence of FM and MPS in patients with LDH. Although the diagnosis of these two soft tissue pain syndromes is generally straightforward, because of a lack of knowledge, an appropriate diagnosis may be ignored. In this context, it has been reported that some patients with FM or MPS have had unnecessary LDH surgery (29,30). During an 18-year period study, it was discovered that 25% of the CLBP patients acquired symptoms of FM (14). We determined a 33.8% indicence of FM in the LDH patient population.

According to our results, both the LDH + FM group and the LDH + MPS groups consistently expressed a higher number of MTrPs, higher pain scores, more cognitive symptoms, depression, and pain or cramps in the lower abdomen. These results conform to another study, which found enhanced pain facilitation in FM and MPS patients compared with CLBP patients (31). FM patients seem to have localized pain before the development of widespread pain, and a link between MTrPs and FM is more than plausible. Previous studies reported that MTrPs were found in 18-70% of the immediate vicinity of a designated tender-point site in FM patients (32,33). This wide incidence rate of MTrPs in FM patients may be explained by the differences in sample sizes and diagnostic criteria used. We observed that most of the FM patients had at least one trigger point. 40.4% of LDH+FM patients had active trigger points and 36.5% had latent trigger points. This result proved the fact that a patient with FM may have latent MTrPs, which may be activated if central sensitization progresses. Alonso-Blanco et al. (34) investigated individuals with FM and found that each woman with FM had an average of 11 MTrPs, with 10 of them being active. They reported a substantial positive association between the number of activated MTrPs and pain severity among FM patients. Additionally, widespread mechanical pain hypersensitivity was associated with a greater number of active MTrPs (34). MTrPs may play a role in the generation of pain, and proper manual examination can detect MTrPs in FM patients. Treatment of active MTrPs alters the central nervous system excitability and alleviates pain in FM (35-37).

Psychopathological changes related to low back pain are highly relevant and they affect pain perception, expression, and persistence (38-40). This study revealed that depressive symptoms may be linked to increased pain severity in LDH patients, similar to previous studies (41-43). 31.2% of all LDH patients experienced depression, whereas patients with FM or MPS exhibited higher depressive symptoms. This association between LDH,

FM, MPS, and depressive symptoms highlights somatic perception as a risk factor for low back pain. In contrast, no difference in depression levels was identified between patients with low back pain and healthy controls in a study (44). Another cross-sectional study of 137 CLBP patients established that none of the patients exhibited signs of clinical anxiety or depression (45). Despite this, the body of knowledge in this field clearly suggests that low back pain and depression are linked in both emerging and general adult populations.

The results of this study support the evidence that FM, MPS, and depression are prevalent in the LDH patient population. Our results follow previous literature demonstrating that low back pain is associated with several comorbid factors (46-48). Although there are significant differences that substantially impact the diagnosis and treatment of FM and MPS, there are no reliable laboratory tests. The potential co-occurrence of FM and MPS raises awareness of the need to examine individuals with LDH. A comprehensive evaluation is necessary to determine a diagnosis and develop a successful comprehensive treatment plan.

Study Limitations

The results of the current study should be seen while considering some limitations. First, other risk factors identified to influence back pain, including inactivity and education level, were not collected as part of this study. As well, the patient population was limited to a single hospital, which may not be representative of the diversity of the adult population. Another limitation was that we did not enroll a healthy control group without LDH in this study. That may be valuable for the determination of depression rates and somatic symptoms of the patient groups.

A study similar to ours was not detected according to literature research related to this topic. This study design and patient examination by experienced physicians may be counted as study strengths. We compared patient groups according to age, gender, and BMI, and all the patients were of the same race.

Conclusion

The prime defining characteristic of LDH is low back pain. However, it's critical to recognize potential sources of pain other than those related to disc herniation. Considering that the diagnostic accuracy and reliability of FM and MPS are inadequate, while they are common sources of low back pain, the coexistence of these clinical syndromes requires attention among LDH patients. In patients with LDH, FM, MPS, and depression seem to impact pain severity and cause additional symptoms. Accurate and reliable examination is essential to ensure optimal management and outcomes for these patients.

Ethics

Ethics Committee Approval: Approval was obtained from Karadeniz Technical University Faculty of Medicine Scientific Research Ethics Committee (dated 2021/05/31, numbered 2021-133).

Informed Consent: Informed consent was taken from all patients.

Peer-reviewed: Internally peer-reviewed.

Authorship Contributions

Concept: G.S., Design: G.S., Data Collection, or Processing: G.S., H.B.S., Analysis, or Interpretation: S.K., Literature Research: G.S., Writing: G.S., D.S.A.

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