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ORIGINAL ARTICLE

The impacts of facet radiofrequency and/or transforaminal steroid injection on level of pain, life quality and degree of depression in patients with chronic low back pain: A retrospective study

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SUMMARY

Objectives: Low back pain is a widespread medical condition seen in middle-aged and elderly individuals, causing labor loss, high treatment costs, depression, and poor life quality. This study aimed to investigate pain levels, life quality, and depression in patients undergoing facet radiofrequency (RF) and/or transforaminal epidural steroid injection (TFESI) for the treatment of chronic low back pain (CLBP).

Methods: The records of 51 patients with low back pain lasting more than three months who underwent interventional procedures for pain management were reviewed retrospectively. Patient data including age, sex, type of interventional treatment, visual analog scale (VAS) scores before and after the procedure, SF-36 life quality scores, and Beck Depression Scale (BDS) scores were obtained from patient tracking forms and the hospital information system.

Results: A total of 51 patients (35 males, 16 females) who received interventional treatment were included in the study. The mean age of the patients was 48.37±13 years. Patients underwent facet RF (n=14), TFESI (n=23), or both procedures combined (n=14). Compared to pre-procedure values, VAS and BDS scores at the third and sixth months were significantly lower ($p<0.05$), while SF-36 life quality scores were significantly higher ($p<0.05$). No significant difference was observed between the third and sixth months ($p>0.05$).

Conclusion: In chronic low back pain, interventional treatments such as facet RF and/or TFESI were found to reduce pain and depression levels and improve life quality.

Keywords: Beck Depression Scale; chronic low back pain; facet radiofrequency; SF-36 life quality; transforaminal epidural steroid injection; Visual Analog Scale.

Introduction

At least once in a lifetime, 58% to 84% of adults in the community are affected by low back pain. Patients who experience an acute episode of low back pain get better 80–90% of the time within 6–8 weeks without any treatment or independent of the treatment provided. Despite the application of all available treatments, pain becomes chronic in 5% of patients.[1] Low back pain that persists for more than three months is referred to as chronic low back pain.[2]

Low back pain may be due to rheumatologic, neoplastic, infectious, and traumatic causes; however, mechanical factors are in the forefront, and 15–45% of low back pain is caused by facet joints.[3] Conservative, medical, surgical, percutaneous interventional procedures, complementary, and alternative treatments may be performed in the treatment of chronic low back pain (CLBP), and a multidisciplinary approach is required. Today, interventional methods including radiofrequency facet (RF) and transforaminal epidural steroid injection (TFESI) play an important role as an efficient and safe method for pain palliation.[4]

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In people suffering from chronic low back pain, quality of life worsens in relation to the level and duration of pain, and depression symptoms are observed in 30–60% of them. On the other hand, depression makes the pain felt more intensely than it really is, and pain-related mobility impairment leads to problems such as failure to perform occupational and social tasks and responsibilities, causing a significant decrease in the quality of life.[5]

The purpose of this study was to investigate the differences in pain, life quality, and depression levels of patients with CLBP who received percutaneous interventional treatments including facet RF and/or TFESI before, and at 3 and 6 months after the procedure.

Materials and Methods

This study was conducted in the Algology Clinic of Eskişehir Osmangazi University Faculty of Medicine after approval of the Non-Interventional Clinical Research Ethics Committee (decision no: 2022/27). This study was conducted in accordance with the Declaration of Helsinki. In this study, 51 patients with low back pain lasting more than three months who underwent facet RF and/or TFESI interventional procedures for pain management were evaluated retrospectively.

In our Algology Clinic, interventional treatments for low back pain are applied regularly. Facet RF and/or TFESI interventional treatments were administered to patients suffering from CLBP, in line with the outpatient clinic examination and imaging results. The patients were informed verbally regarding the procedure before the intervention, and their written informed consent was obtained.

Patients' records were reviewed to include individuals over 18 years old with CLBP who had not changed their medical treatment before the interventional procedure and within the 3 to 6 months after the procedure. These patients answered the Visual Analogue Scale (VAS), Beck Depression Scale (BDS), and SF-36 Quality of Life Questionnaire through face-to-face interviews during follow-up periods.

Patients with advanced hematological, hepatic, or renal dysfunction were not included in the study, as interventional procedures are not performed on such patients in our clinic. Additionally, patients diagnosed with major depression, fibromyalgia, rheumatoid arthritis, or those with a history of alcohol and substance abuse were excluded from the study.

Coagulation parameters and full blood count are routinely evaluated before the procedure in our clinic. Prior to the procedure, vascular access is established from the back of the hand with a 20 G or 22 G branule. The patient is positioned in the prone posture on the scopy table, and ASA-recommended standard monitoring (electrocardiogram, peripheral oxygen saturation, and noninvasive blood pressure) is performed. Intravenous midazolam 0.03 mg/kg and remifentanil 0.1–0.3 mcg/kg are administered for sedation. Both facet RF and TFESI procedures are performed under C-arm scopy guidance. Sterile conditions are maintained by cleaning the skin with 10% antiseptic solution containing povidone-iodine.

The needle for TFESI is advanced into the safe triangle area and followed by the administration of contrast material. Once the distribution of the opaque substance is visualized and correct needle placement is confirmed, a 3 ml volume consisting of 10 mg (2 ml) of 0.5% bupivacaine and 40 mg of triamcinolone acetate is injected for a single level. In facet RF, imaging is used to target the facet joint and nerve. A special electrode (22 G, 5 mm active tip electrode) is used for radiofrequency. Following sensory and motor stimulation and confirmation of the needle position, a local anesthetic is administered. Pulsed radiofrequency is then delivered with the electrode at 42°C for 3 minutes.

The patients are monitored in the hospital for a specific period after the procedure and are invited for follow-up at regular intervals post-discharge.

The score of pain was assessed using the pain intensity VAS. Patients' values indicated on the VAS (0: no pain, 10: the most severe pain possible) were considered as pain intensity.[6] Pain levels were analyzed before the procedure and between the 3rd and 6th months after the procedure.

Patients' levels of depression were examined using the BDS. For each item, the BDS consists of four

Table 1. Patients' demographic information and interventional procedures

Parameters	All of them (n=51)	
	n	%
Mean age, (mean±SD)	48.37±13.93	
Sex		
Male	35	68.6
Female	16	31.4
Interventional procedures		
Facet RF	14	27.5
TFSI	23	45.1
Facet RF+TFSI	14	27.5

SD: Standard deviation; Facet RF: Faset radiofrequency; TFSI: Transforaminal steroid injection.

statements arranged from mild to severe form, with a total of twenty-one items. The lowest score on this scale is 0 and the highest is 63, with depression severity defined as follows: minimal=0–9, mild=10–16, moderate=17–29, severe=30–63.[7]

In this study, the Medical Outcome Study Short Form 36 (SF-36) was used to evaluate life quality. Consisting of 36 items in total, this scale provides a measurement of eight subscales: physical function (10 items), physical role difficulties (4 items), social function (2 items), emotional role difficulties (3 items), mental health (5 items), vitality (4 items), pain (2 items), and general health (5 items). No total score is calculated; rather, each subscale is averaged and presented under titles representing the eight different health dimensions. Based on the last 4 weeks, SF-36 assesses individuals' life quality, and each item is scored between 0–100. Lower scores represent poor health-related life quality, while higher scores represent good health-related life quality.[8]

Statistical Analysis

For the statistical analysis of the data collected from the patient questionnaires, the SPSS 21.0 program was used. For categorical variables, frequencies and percentages were calculated; and for measurements, minimum, maximum, mean, and standard deviation values were determined. Differences in scale scores before, 3 months after, and 6 months after the procedure were analyzed using the repeated ANOVA test. In the event of a significant difference, pairwise comparisons were analyzed using the Bonferroni test. The statistical assessment was performed on the basis of mean values. For statistical decisions, $p<0.05$ was considered the indicator of statistical significance.

Results

In the retrospective file review, 51 patients who received interventional procedures were included in the study. Among the patients, 35 were male and 16 were female. The youngest patient was 24 years old, while the oldest was 83 years old, and the mean age was 48.37±13.93. Facet RF (n=14), TFESI (n=23), or both procedures together (n=14) were performed on the patients (Table 1).

There was a significant decrease in the pain levels of the patients following the procedure compared to the pre-procedure period ($p<0.05$). At the 3rd and 6th months after the procedure, VAS scores were similar ($p>0.05$) (Table 2).

Table 2. BDS and VPS scores of patients

	Minimum	Maximum	Mean±SD	F	p	Pairwise comparison
BDS						
Before the procedure	2	45	14.39±9.18	20.255	0.000*	1>2
3rd month after procedure	0	43	11.49±9.37*			1>3
6th month after procedure	0	43	11.78±9.73*			
VPS						
Before the procedure	3	10	7.35±1.32	105.089	0.000*	1>2
3rd month after procedure	0	9	3.25±2.59*			1>3
6th month after procedure	0	9	3.53±2.62*			

*: P<0.05; BDS: Beck Depression Scale; VPS: Visual Pain Score; SD: Standard deviation.

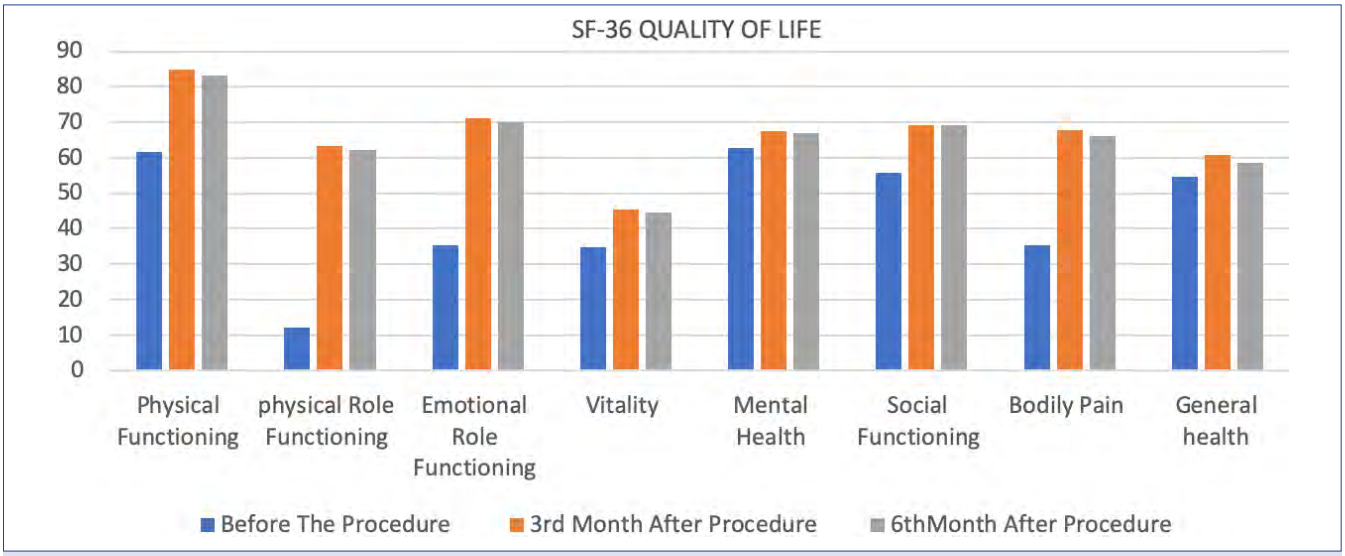

Figure 1. Patients' SF-36 quality of life mean scores.

Patients' depression levels also significantly decreased after the procedure in comparison to pre-procedure values ($p<0.05$). No significant difference was observed between the BDS scores at 3 and 6 months after the procedure ($p>0.05$). The level of depression was found to be correlated with the level of pain (Table 2).

Patients' SF-36 life quality subscales were evaluated statistically on the basis of mean scores before and at 3 and 6 months after the procedure. It was observed that life quality was similar at 3 and 6 months after the procedure and increased significantly in all subscales (physical function, physical role difficulty, social function, emotional role difficulty, mental health, vitality, pain, and general health) compared to before the procedure ($p<0.05$).

Patients' SF-36 quality of life mean scores are shown in Figure 1. The greatest increases were observed in the subscales of physical role difficulties, emotional role difficulties, and pain. The subscales with the least increase in scores were the mental health subscale and the general health perception subscale, respectively.

Discussion

In this study, patients who suffered from CLBP and received percutaneous interventional treatments such as facet RF and/or TFESI were examined. Regardless of the treatment type, a significant decrease in VAS and BDS scores and a significant increase in SF-36 life quality scores were found between the 3rd and 6th months after the intervention when compared to the pre-procedure period.

While it is well known that low back pain is more common in female and middle-aged individuals, in our study, most of the patients who received interventional procedures were male (68.6%). Altinel et al.[9] conducted a survey and reported that the lifetime frequency of low back pain was higher in women (63.2%) compared to men (33.8%), but no difference was found in chronic low back pain between genders, and the risk of having low back pain increased slightly between the ages of 41 and 64. Nevertheless, Esen et al.[10] found in their study that low back pain complaints began at an earlier age in employed individuals and increased with higher education levels. The mean age in our study was 48.7 years, and the youngest patient was 24 years old, supporting both studies.

Before the procedure, the mean VAS score of the patients was 7.35, whereas the mean VAS scores at the 3rd and 6th months after the treatment were 3.25 and 3.53, respectively. A significant decrease in VAS scores at the 3rd month and the persistence of clinical improvement at the 6th month indicate that the early effectiveness of the treatments continues in the long term, in line with the literatüre.[11] In a prospective study conducted by Wilby et al.[12] in patients with CLBP, TFESI was found to be as effective as surgery, with longer efficacy and less risk of complications compared with microdiscectomy in

terms of pain palliation. Paksoy K.[13] applied facet RF treatment to patients with osteoporotic facet syndrome, and VAS scores were compared before and at 1, 3, and 6 months after the procedure. It was found that the VAS scores were significantly lower in the 1st month and that the improvement continued through the 6th month. Our study found similar results and supports these findings.

The BDS was used to evaluate depression in our present study. The BDS was designed by Beck et al.[14] in order to evaluate behavioral symptoms of depression in adolescents and adults. It was translated into Turkish in two forms, and its validity and reliability studies were conducted to ensure easy self-administration. Our patients' mean BDS scores were found to be similar at 3 and 6 months and significantly lower than before the procedure. The parallelism between the patients' VAS scores and BDS scores suggests that there is a correlation between pain level and depression. In a review of 244 articles, Linton et al.[15] demonstrated that VAS and BDS values of patients who received surgical treatment for CLBP improved significantly after surgery when compared to the pre-surgical period.

It was observed in our study that the depression level reduced with the decrease or total disappearance of pain, but it did not completely resolve. This situation indicates that pain is not the only reason for the patients' depression, or that pain-related depression may not fully resolve with pain treatment alone. Pain and depression are known to provoke each other and play an important role in the initiation and maintenance of chronic conditions. Nevertheless, because the mechanism of the relationship between depression and pain has not yet been precisely determined, a definite cause-and-effect relationship cannot be established.[4]

Considering the patients' life quality, it was found that all subscales of the SF-36 life quality scale were similar at the 3rd and 6th months after the procedure and significantly improved compared to the pre-procedure period. The increase in life quality with a decrease in VAS scores implies that pain negatively affects life quality. Gündoğdu et al.[16] conducted a study in which a radiofrequency denervation procedure was applied to patients with CLBP due to facet joint syndrome. They showed that patients' VAS scores decreased, their life quality improved, and the efficacy of treatment lasted for 6 to 12 months following the procedure. The results of our study indicate that life quality improved with pain reduction, and this improvement was sustained at the 6th month, supporting their findings.

Taşdemir et al.[17] investigated VAS scores and SF-36 life quality scales of patients with CLBP who received TFESI treatment before and after the procedure, and observed that pain decreased and life quality improved. In another study, the influence of age on life quality in individuals with chronic low back pain was investigated, and it was found that older patients scored higher in most mental health and wellness measures, and scored equal to younger individuals in life quality measurements despite higher disability scores.[18] This is thought to result from personal factors such as increased pain experience with age, pain acceptance, and different interpretations of health-related well-being.

Furthermore, previous studies suggest that the probability of developing chronic pain and depression is higher in the elderly, and the elderly population is increasing worldwide.[19] Similarly, in a study comparing functional status and depression in young and elderly patients with CLBP, Yumuşakhuylu et al.[20] demonstrated that disability and depression were significantly more prevalent in elderly patients. For this reason, we believe that life quality can be significantly improved through multimodal approaches including depression treatment, making the treatment of CLBP even more important in elderly patients. The limitations of this study were that it was single-center and retrospective.

Conclusion

The positive results of interventional procedures such as facet RF and/or TFESI used in the treatment of CLBP—including long-term pain relief, decreased depression levels, and improved life quality in most patients—indicate the effectiveness of these treatments. We also believe that, since pain causes depression and reduces life quality, it should be addressed through a multidisciplinary approach.

Ethics Committee Approval: The Eskisehir Osmangazi University Non-Interventional Clinical Research Ethics Committee granted approval for this study (date: 25.02.2022, number: 2022/27).

Informed Consent: Written informed consents were obtained from patients who participated in this study.

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