Retrospective Analysis of Intradiscal Radiofrequency Decompression Therapy in Lumbar Disk Herniation

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Abstract

Aim: This study evaluates the effects of demographic and clinical factors on surgical outcomes in patients undergoing lumbar decompression surgery. Specifically, the relationships between gender, age, presence of degeneration, lesion location, body mass index (BMI), and Visual Analog Scale (VAS) scores were analyzed.

Methods: This retrospective study was conducted on 57 patients who underwent lumbar decompression surgery. Demographic data, clinical findings, and surgical outcomes were recorded. Data were evaluated using statistical analyses such as t-tests, Mann-Whitney U tests, and ANOVA.

Results: No significant difference was found between gender and VAS scores (p = 0.783). The presence of degeneration significantly increased VAS scores (p = 0.0096), with patients with degeneration reporting higher pain (VAS = 4.79) compared to those without degeneration (VAS = 4.39). The average age of patients with degeneration was 51.14 years, compared to 43.14 years for those without (p = 0.0029). No significant difference was found between lesion location and VAS scores (p = 0.603). However, multilevel lesions were associated with higher VAS scores. A weak but significant positive correlation was found between BMI and VAS scores (r = 0.35).

Conclusion: Postoperative pain management in lumbar decompression surgery is significantly influenced by factors such as the presence of degeneration, lesion location, and BMI. This study emphasizes the importance of considering these factors when formulating personalized treatment plans during preoperative evaluations. Future research may help validate these findings in larger patient populations and aid in developing new strategies to improve surgical outcomes.

***Keywords**: Radiofrequency thermocoagulation, nucleoplasty, lumbar decompression*

1. Introduction

Lumbar decompression surgery is a widely used surgical method for treating degenerative spine diseases, such as herniated discs and spinal stenosis.[1] Factors such as aging, genetic predisposition, and lifestyle can accelerate spinal degeneration, leading to chronic pain that necessitates surgical intervention.[2] This study aims to examine the impact of demographic and clinical characteristics on surgical outcomes in patients undergoing lumbar decompression surgery. Parameters such as gender, age, presence of degeneration, lesion location, body mass index (BMI), and Visual Analog Scale (VAS) scores were assessed.

However, the challenges associated with decompression, including the prevalence of pain, associated risk factors, and impact on clinical management, are poorly understood.

In particular, there is a significant lack of data on the evaluation of pain management using decompression techniques and the demographic or clinical variability associated with this approach. As a result, clinicians face challenges in planning and managing the risks, methodologies, and complications associated with decompression therapy in patients with lumbar disc herniation. This study aims to present and share our clinical experience with the method.

This study presents important factors related to the management of low back and leg pain, especially in patients with radiculopathy.

2. Materials And Methods

Since all patients who applied to the algology clinic and were clinically followed were included in the study, a power analysis was not performed.

Inclusion Criteria:

• Patients who received Radiofrequency or Cryoablation treatment due to chronic pain

• Patients evaluated with VAS in the preoperative and postopera-

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tive periods
• Patients with at least 6 months of follow-up after treatment

Exclusion Criteria:
• Patients who had previously received the same treatment methods
• Individuals with neurological or musculoskeletal diseases
• Patients not followed up for 6 months after treatment

In this retrospective study, 57 patients were evaluated. Demographic data (gender, age, BMI), clinical findings (presence of degeneration, lesion location), and surgical outcomes (VAS scores) were collected. Statistical analyses were performed using t-tests, Mann-Whitney U tests, and ANOVA to compare differences between groups. All analyses were conducted using SPSS software.

2.1. Procedure Technique

The patient is positioned prone in the operating room, with a pillow placed under the abdomen. After local cleaning and sterile draping, the relevant disc space is identified under fluoroscopy. The C-arm is adjusted to achieve optimal imaging in a caudal-cephalad oblique position, followed by a lateral oblique position.[3,4] Once the relevant disc space is marked, the skin and subcutaneous tissues are infiltrated with a local anesthetic. A 17-gauge guiding needle is advanced toward the disc, with depth controlled via A-P and lateral images. The needle is advanced to the boundary of the annulus fibrosus and nucleus pulposus. The needle's position is stabilized using a special device. A pulse radiofrequency is applied at 42°C for 4 minutes. At the end of the procedure, the needle is withdrawn, and the procedure is concluded.

3. Results

The demographic characteristics of the patients participating in the study are presented in Table 1.

A significant relationship was found between the presence of degeneration and age (p = 0.0029). The average age of patients with degeneration was 51.14 years, while it was 43.14 years for those without.[4,5]

A significant difference was found between the presence of degeneration and VAS scores (p=0.0096). Patients with degeneration reported average VAS scores of 4.79, while those without reported scores of 4.39.[6,7]

Figure 1

Degeneration and VAS Scores

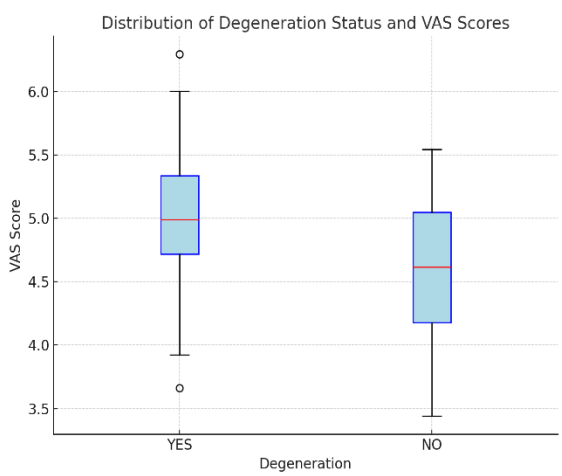

Figure 2

Lesion Location and VAS Scores

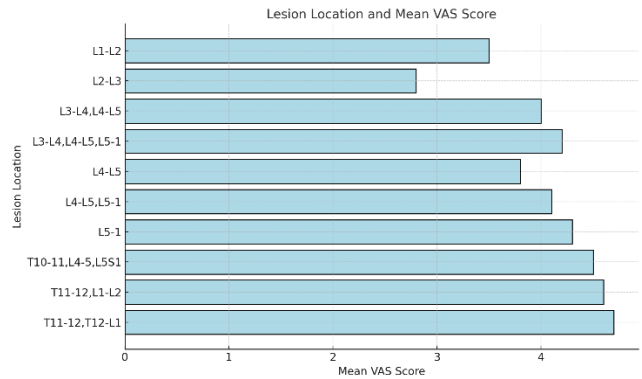

Figure 3

BMI and VAS Scores Relationship

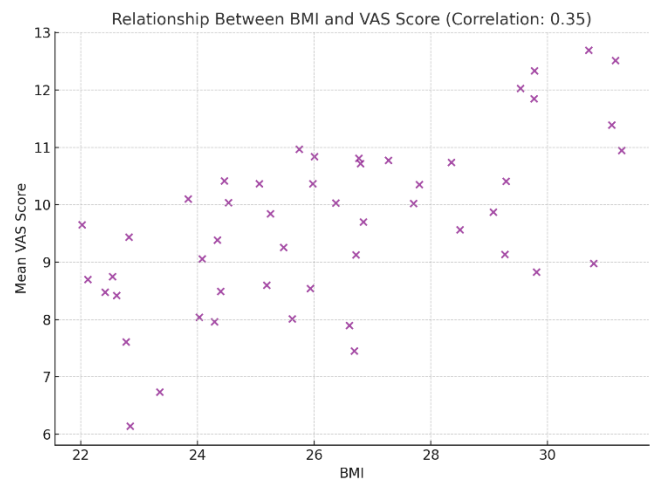

Table 1

Demographic Data

Category	Detail	Count	Percentage (%)
Gender	Male	29	50.9
	Female	28	49.1
Age	Average Age	-	47.2
Median Age		-	45.0
Age Range		-	26-68
Degeneration	Present	29	50.9
	Absent	28	49.1
Previous Surgery	Present	7	12.3
	Absent	50	87.7

There was no statistically significant difference between lesion location and VAS scores (p = 0.603). However, higher VAS scores were observed in patients with multilevel lesions.

A weak but significant positive correlation was found between BMI and VAS scores (r = 0.35). Patients with higher BMI reported generally higher VAS scores. [8,13] (figure 3)

4. Discussion

The findings of this study detail various demographic and clinical factors influencing surgical outcomes after lumbar decompression surgery. This discussion includes a comparison of these findings with the literature and our recommendations for clinical practice.

In our study, no significant effect of gender on VAS scores was found (p = 0.783). There was no noticeable difference in VAS scores between male and female patients. This finding suggests that pain perception after lumbar decompression surgery is not directly associated with gender. Conflicting findings exist in the literature regarding the impact of gender on pain perception; while some studies indicate women report higher pain scores post-surgery[10,14], others find no significant role for gender in pain management.

The presence of degeneration was identified as a significant factor that increases VAS scores (p = 0.0096). Patients with degeneration reported higher pain scores compared to those without. This finding confirms the adverse effects of degenerative spinal diseases on surgical outcomes and suggests that postoperative pain management may be more challenging in these patients.[6,7] Moreover, degeneration correlated positively with age; the increasing prevalence of degeneration among older patients indicates that they may require more intensive postoperative pain management.

The impact of lesion location on VAS scores was minimal; however, higher VAS scores were observed in patients with multilevel lesions. This finding may be explained by the increased tissue trauma associated with more extensive surgical interventions.[9,10,12] It is known that multilevel spinal surgeries can be more complex and challenging, particularly in patients with significant degenerative changes.

The weak but positive correlation between BMI and VAS scores (r = 0.35) raises considerations about the potential effects of factors such as obesity on surgical outcomes. High BMI is often associated with increased postoperative complication rates and prolonged recovery times.[8,9,13] In our study, higher BMI was associated with elevated VAS scores, suggesting that pain management post-surgery may be more difficult in patients with high BMI. This highlights the importance of preoperative weight management strategies for patients with high BMI to improve surgical outcomes.

The findings of this study reveal several factors influencing surgical outcomes in patients undergoing lumbar decompression surgery. Particularly, the presence of degeneration and high BMI emerged as significant factors that increase postoperative pain levels. Surgeons should conduct thorough preoperative evaluations for such patients and adopt more intensive pain management strategies in the postoperative period. Additionally, elderly patients with degenerative changes should be monitored more closely after surgery.[11,15]

Considering that lesion location did not have a significant impact on postoperative pain, the choice of surgical approach should primarily be based on the patient's overall health status and surgical risks. However, it is important to remember that patients planned for multilevel spinal surgeries may experience longer and more complicated recovery processes.

5. Conclusion

This study emphasizes the importance of personalized approaches in postoperative pain management following lumbar decompression surgery. Careful evaluation of patients' demographic and clinical characteristics can contribute to better outcomes in surgical planning and postoperative care. Future studies may validate these findings in larger patient populations and aid in developing strategies to enhance the effectiveness of lumbar decompression surgeries.

Statement of ethics

Ethical permission was obtained from the Adana City Training and Research Hospital Clinical / Human Research Ethics Committee for this study date on October 11, 2024, and decision number 150 and Helsinki Declaration rules were followed to conduct this study.

Source of Finance

The authors declare that they have received no financial support for this study

Conflict of interest statement

The authors declare that they have no conflict of interest.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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