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DOI: 10.46903/gjms/23.1.1812

ORIGINAL ARTICLE

TRANSFORAMINAL LUMBAR EPIDURAL STEROID INJECTION FOR LOW BACK PAIN WITH RADICULOPATHY. PATIENTS RELATED 1-YEAR OUTCOMES

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ABSTRACT

Background: Low back pain with radiculopathy, often resulting from intervertebral disc herniation, significantly impairs quality of life and functions. This study evaluated the efficacy of transforaminal lumbar epidural steroid injections (TFESIs) in providing relief to patients suffering from radiculopathy over a one-year follow-up period.

Materials & Methods: An observational, analytical study was conducted on 21 patients aged 25 to 56 yrs. with radiculopathy, confirmed by MRI and unresponsive to conservative treatments, receiving TFESIs at MTI, DHQ Bannu from March 2023 to Sep. 2023. Pain levels were evaluated using a numerical rating scale (NRS), and functional ability was assessed with the Oswestry Disability Index (ODI). Patient satisfaction was measured through the Patient Satisfaction Questionnaire (PSQ).

Results: The study analyzed the outcomes of 21 patients undergoing treatment for lumbar disc issues revealed significant improvements in pain and functional ability. The patients, with an age range of 25 to 56 and an almost equal sex distribution, showed substantial reductions in pain (NRS scores) and disability (ODI scores) post-treatment. While most patients expressed high satisfaction with the treatment, 38 % continued to use opioids, highlighting the need for ongoing pain management. Additionally, approximately 19% of patients required further surgical interventions.

Conclusions: TFESIs appear to be an effective non-surgical intervention for patients with low back pain and radiculopathy due to disc herniation, leading to significant pain reduction and improved function. However, more extensive, multi-center randomized trials are needed to confirm these findings and evaluate the long-term safety and efficacy of this treatment approach.

KEY WORDS: Transforaminal; Steroid Injection; Radiculopathy; Back; Pain; Lumbar; Disc.

Cite as: Jan AU, Khan AU, Ahmad S, Khan S, Ullah S, Ullah S. Transforaminal lumbar epidural steroid injection for low back pain with radiculopathy. patients related 1-year outcomes. Gomal J Med Sci 2025 Jan-Mar;23(1):40-4. https://doi.org/1046903/gjms/23.1.1812

INTRODUCTION

Backache with leg radiation is a major cause among different forms of back pain. It can be linked to a herniated disc compressing on the nerve root, causing pain, functional impairment, and the need to take medications such as opioids for pain relief.[1] Along with rising prevalence, the number of therapeutic approaches for persistent back pain and radiculopathy is increasing. Majority of patients will improve with conservative therapy. However, in the event that conservative treatments fail, lumbar radiculopathy may be addressed by applying various surgical modalities and nonsurgical eg epidural injections.[2] For many years, lumbar pain and radiculopathy caused by intervertebral disc compression have been addressed with epidural steroid injections (ESIs), a non-surgical therapeutic option. Transforaminal epidural injections (ESIs) are more selective and can target particular nerves. Epidural steroid can be delivered using injections through various routes such as transforaminal, interlaminar, or caudal.[1,2] Transforaminal ESI, highly effective treatment option for relieving pain and enhancing function since it can deposit a higher dose of steroid near the pain producers in anterior epidural region, supplying larger quantity of

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Date Submitted: 10-10-2024
Date Revised: 27-02-2025
Date Accepted: 09-03-2025

drug delivery.[3] The rationale of the study was that, despite the potential benefits of transforaminal ESIs, there is currently no solid evidence supporting their use for treating chronic back pain with radiculopathy, and existing prospective studies have shown inconsistent results regarding the effectiveness of steroid injections in reducing pain and enhancing functional outcomes.[4] The aim of this study was to determine whether transforaminal lumbar epidural steroid injections are effective in treating patients who experience radiculopathy as a result of protruding lumbar intervertebral discs.

MATERIALS AND METHODS

This was an observational study done in the Orthopedic Department of MTI, DHQ Hospital, Bannu, running from March 2023 to Sep. 2023. The research plan was authorized by the hospital's ethical committee. A written informed consent was taken before the procedure. The study included patients aged 18 to 65 years who had a history of low back pain accompanied by radiculopathy for a minimum of six weeks. Participants were required to have a confirmed diagnosis of intervertebral disc herniation or protrusion as demonstrated by imaging (MRI) and to have not responded to conservative treatment methods. Patients who had undergone lumbar surgery in the past, as well as those with a previous diagnosis of total spinal canal stenosis or infection were excluded from the study.

Each patient was informed about the purpose and objectives of the study, and they were instructed to complete the questionnaire or assess each scale independently. A verbal numerical rating scale (NRS) was applied to assess the degree of pain. The NRS is an extensively utilized scale to assess pain, possibly because its 0–10 meter, which is preferred by healthcare providers, and its ease of administration without the need for specialist equipment. "How much your pain has been since last 14 days, where 0 is considered no pain and 10 is the worst pain you can imagine?" was a popular question asked of patients. The Oswestry Disability Index was established to assess functional ability (ODI). The ODI is a self-administered questionnaire that has 10 items with six response categories each that measure "back-specific function." A 0–100 scale is established by assigning each component a value between 0 and 5, with bigger scores reflecting worse performance. Pain level, self-care, lifting, walking, sitting, standing, sleeping, employment, social life, and travel are among the ten items. Individuals who scored between 0–20 indicate minimal disability, 21–40 demonstrate moderate disability, 41–60 indicate severe disability, 61–80 suggest handicapped, and 81–100 indicate bedridden or exaggerated symptoms. The Patient Satisfaction Questionnaire (PSQ) was used to assess patient satisfaction. PSQ is a tool designed particularly for measuring treatment satisfaction. Patients were asked to select from five options, ranging from good to poor, for their overall TFESI assessment. The data was analyzed using Microsoft office 16 Excel.

RESULT

The study included the outcomes of 21 patients treated for lumbar disc issues. The patient demographics include an age range of 25 to 56 years, with an even split between 10 females and 11 males. Regarding the disc levels involved, the L4-L5 disc was the most common, affected in 14 cases, followed by L5-S1 in 7 cases. **(Table 1)** Additional transforaminal injections were needed in 23.8 % of cases after the initial injection. Opioids consumptions were present in 38% of case while only 19 % of the cases needed surgery after the injection. **(Table 1)** In terms of outcome measures, the analysis shows statistically significant improvements after the treatment. (P value$<$0.05). The mean Numerical Rating Scale (NRS) score for pain decreased from 7.67$\pm$0.65 before treatment to 2.23$\pm$1.37 after, an average reduction of 5.44 points. Similarly, the mean Oswestry Disability Index (ODI) score for functional ability improved from 50.38 $\pm$1.37 to 14.57$\pm$7.57 a 35.81 reduction on average. The patient satisfaction ratings were generally positive, with a mean Patient Satisfaction Questionnaire (PSQ) score of 3.59$\pm$0.188 out of 5. **(Table 2)**

The mean Oswestry Disability Index (ODI) scores were stratified on the basis of gender, age groups and level of disc protrusion before and after the injection. **(Fig 1)** Female mean ODI scores decreased from 51.8$\pm$6.17 to 12.6$\pm$8.55 while male scores exhibited a similar decline from 49.09 $\pm$2.84to 16.36$\pm$6.43 after the injection. These results suggest a noteworthy improvement in functional ability and a reduction in disability perception within both groups. (P value $<$0.05) **(Fig 1, A)** The mean ODI scores in the age group below 40 decreased from 52.5 $\pm$ 6.04 to 12.8$\pm$ 9.02 after the injection. Similarly, the mean NRS score in the age group 40 and above 40, decreased from 48.7 $\pm$ 2.95 to 15.8 $\pm$ 6.40 indicating a substantial demographic alteration. (P value $<$0.05). **(Fig 1, B)** Similarly, ODI scores at the L4-L5 level decreased from 50.7$\pm$5.43 to 13.5$\pm$7.40, while scores at the L4-L5 and L5-S1 levels decreased from 49.5$\pm$3.45 to 16.7$\pm$8.01. These reductions suggest a considerable improvement in functional disability in the patients assessed. (P value $<$0.05) **(Fig 1, C)**

Similarly, the mean Numeric Rating Scale (NRS) score was stratified on the basis of gender, age groups and level of disc protrusion before and after the injection. **(Fig 2)** Both female and male subjects experienced a decrease, with the mean NRS score declining from 7.5$\pm$0.84 to 2.8$\pm$1.61 in females and from 7.8 $\pm$0.40 to 1.72$\pm$0.90 in males, suggesting a significant positive impact of the intervention on the measured outcome. (P value $<$0.05). **(Fig 2,**

A) The mean NRS score in the age group below 40 decreased from 7.6 ±0.70 to 2.22 ±1.85 after the injection. Similarly, the mean NRS score in the age group 40 and above 40, decreased from 7.6 ±0.65 to 2.25±0.96 a substantial decrease was observed in both groups (P value <0.05). **(Fig 2, B)** Specifically, mean NRS values for the L4-L5 and L4-L5, L5-S1 spinal segments decreased from 7.71 ±0.46 to 2.14 ±1.40 and from 7.57±0.97 to 2.43±1.39, respectively, suggesting a significant alleviation of reported pain levels in both areas. (P value <0.05) **(Fig 2, C)**

Table

Parameter		Number of patients	%age
Age	Below 40	9	42.86
	40 and above	12	57.14
Gender	Male	11	52.38
	Female	10	47.61
Disc level	L4-L5	14	66.66
	L4-L5, L5-S1	7	33.33
Opioid consumption needed After injection	Yes	8	38.09
	No	13	61.90
Surgery done After injection	Yes	4	19.04
	No	17	80.95
Additional Injection needed After injection	Yes	5	23.80
	No	16	76.19

Table:2

Parameter		Mean± std.	P value
NRS score	Before Injection	7.67±0.65	<0.05
	After Injection	2.23±1.37	
ODI score	Before Injection	50.38±4.81	<0.05
	After Injection	14.57±7.57	
PSQ		3.59±0.188	

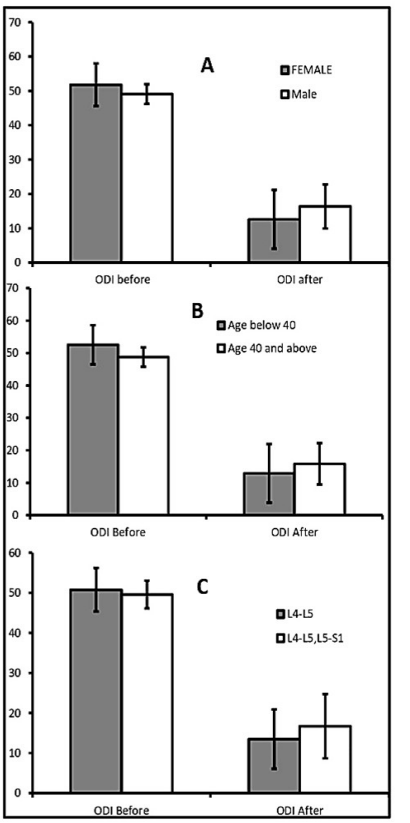

Fig: 1

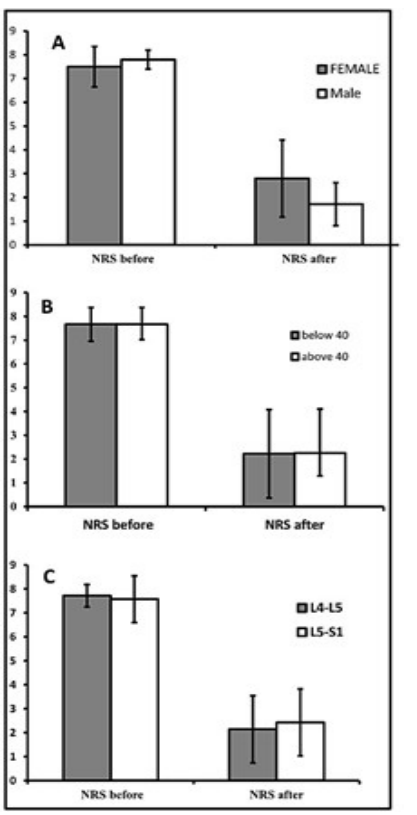

Fig: 2

DISCUSSION

A paucity of research exists regarding the long-term efficacy of interventions for managing low back pain with radiculopathy, specifically concerning opioid use, repeat injections, and surgical intervention. A 2018 study, analyzing long-term outcomes of epidural corticosteroid injections, revealed initial success at six months but demonstrated substantial symptom recurrence and subsequent need for additional treatments, including opioids, repeat injections, or surgery, within five years.[5] This was also found in our study which showed opioid consumption in 38% patients, additional injection in 23.8% cases and the need for surgery in 19% cases but in a span of only one year.

Multiple studies demonstrated the superior efficacy of transforaminal epidural steroid injections (TFESIs) compared to saline trigger-point injections, particularly in patients experiencing radicular pain stemming from herniated or protruded intervertebral discs. [6,7,8.] Our study also demonstrated a statistically significant reduction in mean Numerical Rating Scale (NRS) score after the injection. A recent paper demonstrated significant improvements in standing and walking tolerance, alongside notable reductions in unilateral radicular pain after TFESIs.[9] These findings, corroborating previous research, were evidenced by improvements in mean Oswestry Disability Index (ODI) scores following the injections in our study. While previous studies suggest lumbar epidural steroid injections (ESIs) reduce pain and improve activity levels, the precise impact on opioid consumption remains unclear. In our study, 38% of patients required opioid analgesics post-injection. Although some research demonstrates immediate pain reduction and decreased opioid use following ESIs, these effects often diminish over time.[10,11]

Epidural steroid injections (ESIs) provided moderate benefit for approximately half of patients with persistent symptoms following conservative treatment for lumbar disc herniation, though efficacy was less pronounced than discectomy in symptom and disability reduction. In this study, 24 % patients received repeat injections, and the 19 % surgical conversion rate aligns with previously reported long-term outcomes. [12,13]

This research acknowledges its limitations, particularly regarding sample size. Future studies employing multi-center, randomized, prospective designs with larger, clustered samples are crucial to validate these preliminary findings and establish clinically significant results.

CONCLUSION

Patients having low back pain with radiculopathy due to lumbar intervertebral disc herniation/protrusion may benefit from a lumbar transforaminal epidural steroid injection. Larger sample sizes and longer follow-up dates are required for future research to validate these results and examine the intervention's long-term safety and efficacy.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
GRANT SUPPORT AND FINANCIAL DISCLOSURE
None declared.

AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	AUJ, AUK
Acquisition, Analysis or Interpretation of Data:	AUJ, AUK, SA, SK, SU
Manuscript Writing & Approval:	AUJ, AUK, SA, SK, SU, SU

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.