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Case Series

# The impact of transforaminal epidural steroid injections on pain severity and disability in lumbar disc herniation with radiculopathy: a vas and odi analysis

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**Statistics**

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Abstract

Introduction: Lumbar disc herniation with radiculopathy is a common cause of Low Back Pain (LBP) accompanied by leg discomfort, often originating from degenerative disc herniation. This study aimed to assess the impact of Transforaminal Epidural Steroid Injections (TFESIs) on pain severity and disability in these patients.

Aim and objectives: The study aimed to observe the effect of TFESIs on pain severity (assessed using Visual Analog Scale, VAS) and disability score (Oswestry Disability Index, ODI) in the management of lumbar disc herniation with radiculopathy.

Methodology: Patients over 18 years with confirmed lumbar disc herniation and radiculopathy via MRI were included, regardless of prior surgery or acute/recurrent disc herniations. Exclusion criteria encompassed acute injuries, neurological impairments, infectious causes, steroid allergies, and inconclusive MRI-clinical correlation. TFESIs were administered under fluoroscopic guidance, targeting the "safe triangle" above and lateral to the nerve root. Neural fiber-blocking agents like Xylocaine, Bupivacaine, and Triamcinolone were used. The choice of corticosteroid varied among practitioners. While severe complications were rare, minor issues like headaches were more common.

Results: The majority of participants were aged 36-55 years (68.3%), with a slight male predominance (55%). Symptoms included LBA with bilateral (20.0%), left (43.3%), or right (36.7%) lower limb radiculopathy. Most had symptoms for 4-6 months (40.0%). Pain severity, assessed using VAS, ranged from moderate to severe. Notably, ODI scores significantly decreased from baseline to 1 week, 3 weeks, 3 months, and 1 year post-treatment, indicating an improvement in disability levels.

Conclusion: Transforaminal Epidural Steroid Injections appear to be an effective intervention in managing lumbar disc herniation with radiculopathy. This study provides valuable insights into pain severity and disability reduction, suggesting its potential as a treatment option for patients suffering from this condition. Further research is needed to corroborate these findings.

Keywords: Low back ache, Radiculopathy, Trasforaminal steroid injection, ODI score, Disc herniation.

## INTRODUCTION

One of frequent reason of LBP (low back pain) that is accompanied by radiculopathy in the lower extremities is a herniation of a degenerative disc [1]. This condition may also produce pain in the lower limbs. Back discomfort that is accompanied by leg discomfort is often brought on by a herniated lumbar disc or other disorders that affect the region surrounding the spinal cord and nerve roots [2]. Back discomfort may also be brought on by being overweight or obese [3]. Radiculopathy is a condition that has its genesis in the lower back and is brought on by the compression of a herniated lumbar disc on the nerve roots as they exit the spinal column [4]. When doing a physical examination, the ability to reproduce discomfort by elevating the straight leg and, in particular, by performing a sciatic stretch test is the single most crucial diagnostic indicator (dorsiflexion of the ankle with a straight leg raising position) [5]. Acute sciatica with symptoms and signs related to the nerve root may have as its underlying cause a herniation, degenerative changes with central or lateral stenosis, fibrosis, inflammation of various kinds, a tumour, or a nerve fibre problem [6]. SCS (spinal canal stenosis) can occur at any level encompassing cervical, dorsal, lumbar, sacral spine [7]. The symptoms of neurogenic claudication are considerable, and these symptoms are altered not only by the position of the body but also by motions such as walking, standing, sitting, or bending. If the patient exhibits no signs or symptoms throughout any part of the evaluation, the findings can be considered normal [8]. If, on the other hand, the examination is carried out after the patient has engaged in some type of physical activity, the findings may indicate that the patient has sensory abnormalities, motor weakness, and diminished reflexes[9]. The straight leg lift test has been shown to have favourable outcomes in a variety of different scenarios[10]. LBP may be brought on by a variety of various factors; in relation to disc pain, a number of distinct etiologies are related, such as disc herniation, disc protrusion, and disc degeneration[11]. LBP can also be caused by a combination of these factors. Both the annulus fibrosis and the nucleus pulposus have the potential to herniate, degenerate, or become infected. Any of these three conditions can result in inflammation of the dura, nerve roots, and dorsal root ganglia, in addition to an increase in phospholipase A2 activity, which causes discomfort and radiculopathy [12].

Patients who suffer from back and leg pain have been seen to have modest abnormalities in the exterior morphology of the annulus [13]. These individuals may present with leg discomfort, paresthesia, and signs of dural tension. The function of inflammatory mediators in these patients has been observed [14]. A chemical radiculitis can be caused when inflammatory factors, such as phospholipase A2, are present in an abnormally high quantity after a disc herniation has occurred [15].

This study is crucial because lumbar disc herniation with radiculopathy can lead to debilitating pain and functional limitations, yet the effectiveness of Transforaminal Epidural Steroid Injections (TFESIs) remains unclear due to conflicting evidence. By analyzing the impact of TFESIs on pain severity and disability using validated measures like the Visual Analog Scale (VAS) and the Oswestry Disability Index (ODI), we aim to provide clinicians with reliable insights for evidence-based decision-making, potentially improving the quality of life for patients suffering from this condition, while also potentially reducing the need for more invasive treatments and healthcare costs.

## AIM AND OBJECTIVES

To observe the effect of Transforaminal epidural steroid injection on the following parameters in management of lumbar disc herniation with radiculopathy:

1.Severity of pain – Visual analogue scale (VAS)

2.Disability score– Oswestry disability index (ODI)

## METHODOLOGY

In this study, specific inclusion and exclusion criteria were established to ensure the relevance and safety of the research. Patients over the age of 18 with a confirmed diagnosis of lumbar disc herniation and radiculopathy, as demonstrated by MRI findings, were included in the study. Both patients who had previous surgeries and those with acute or recurrent disc herniations were considered. However, individuals with acute injuries, coccygeal syndrome, developing neurological impairments, pathological or infectious etiologies, a history of steroid allergies, or a lack of correlation between MRI and clinical symptoms were excluded from the study. The methodology involved the administration of Transforaminal Epidural Steroid Injections (TFESIs) to patients lying on their fronts, guided by fluoroscopy. The injection site, known as the "safe triangle," was targeted to ensure the needle's placement above and laterally to the nerve root. C-Arm positioning varied depending on the targeted nerve roots (L3, L4, L5, or S1), with the aim of accurately delivering the injections. Neural fiber-blocking agents such as Xylocaine, Bupivacaine, and Triamcinolone were used to provide local anesthesia and steroid therapy. The choice of corticosteroid remained a topic of debate among practitioners. While complications associated with TFESIs are generally mild, rare and severe events have been reported in the literature, including vascular embolic events with particulate corticosteroids. These severe

events may lead to significant complications, such as spinal cord ischemia, paraplegia, and even death. However, the incidence of such events is low, and they are mostly documented in case reports, making it difficult to ascertain their exact occurrence rate. In contrast, more minor complications, such as non-positional headaches or increased pain, are more commonly reported in studies.

It's worth noting that while complications like meningitis, pneumocephalus, and pneumorrhachis have been documented following cervical epidural steroid injections, they have not been reported following transforaminal epidural steroid injections in the lumbar spine.

## RESULT

The demographic characteristics of the study population revealed that the majority of the participants fell within the age groups of 36 years-45 years (35.0%) and 46 years -55 years (33.3%), with smaller proportions in the above 55 years (16.7%) and 25 years -35 years (15.0%) age groups(Table 1). In terms of gender distribution, there were 33 (55.0%) males and 27 (45.0%) females included in the study (Fig.1). Regarding the distribution of symptoms, the study found that Lower Back Pain (LBA) with bilateral lower limb radiculopathy occurred in 20.0% of the subjects, while LBA with left lower limb radiculopathy was observed in 43.3% of the cases, and LBA with right lower limb radiculopathy was seen in 36.7% of the participants (Table 2). The duration of low backache among the participants varied, with the majority (40.0%) reporting a duration of 4 months-6 months, followed by 7-9 months (30.0%), greater than 9 months (20.0%), and 1 years -3 months (10.0%) (Table 3). The Visual Analog Score (VAS) was used to assess pain severity, and the study found that VAS scores were distributed as follows: a score of 6 among 1 (1.7%) participant, 7 among 11 (18.3%) participants, 8 among 27 (45.0%) participants, and 9 among 21 (35.0%) participants, indicating varying degrees of pain severity in the study population (Table 4). Furthermore, the study evaluated the Oswestry Disability Index (ODI) scores over time (Table 5). The mean ODI score showed a significant decrease from the initial assessment immediately after treatment to 1 week, 3 weeks, 3 months, and 1 year post-treatment (Table 6). This suggests an improvement in disability levels among the study participants as a result of the intervention, indicating the potential efficacy of Transforaminal Epidural Steroid Injections in managing lumbar disc herniation with radiculopathy.

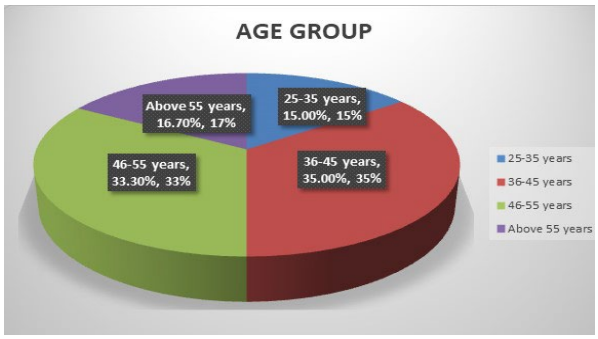


**Fig. 1.** Describing age group

**Table 1.** Describing the study groups as per gender

| Gender | Frequency | Percent |
|---|---|---|
| Female | 27 | 45.0% |
| Male | 33 | 55.0% |
| Total | 60 | 100.0% |

**Table 2.** Describing the study groups as per their chief complaints

| Chief Complaints | Frequency | Percent |
|---|---|---|
| LBA with bilateral lower limb radiculopathy | 12 | 20.0% |
| LBA with left lower limb radiculopathy | 26 | 43.3% |
| LBA with right lower limb radiculopathy | 22 | 36.7% |

**Table 3.** Describing the study groups as per Duration of low back ache

| Duration of low back ache | Frequency | Percent |
|---|---|---|
| 1-3 months | 3 | 10.0% |
| 4-6 months | 12 | 40.0% |
| 7-9 months | 9 | 30.0% |
| > 9 months | 6 | 20.0% |

**Table 4.** Describing the study groups as per Visual Analog Score

| Visual Analog Score | Frequency | Percent |
|---|---|---|
| 6 | 1 | 1.7% |
| 7 | 11 | 18.3% |
| 8 | 27 | 45.0% |
| 9 | 21 | 35.0% |

**Table 5.** Describing the study groups as per ODI

| Oswestry score | Frequency | Percent |
|---|---|---|
| 25 | 1 | 1.7% |
| 30 | 50 | 83.3% |
| 35 | 7 | 11.7% |

| | | |
|---|---|---|
| 40 | 1 | 1.7% |
| 45 | 1 | 1.7% |

**Table 6.** Describing the study groups as per ODI

| ODI | Mean | Std. Deviation | F-value | p-value |
|---|---|---|---|---|
| Immediately | 5.36 | 1.24 | 18.832 | 0.027* |
| 1 week | 4.00 | 0.00 | | |
| 3 weeks | 3.00 | 0.00 | | |
| 3 months | 2.02 | 0.13 | | |
| 1 year | 2.36 | 0.49 | | |

In contemporary society, Lower Back Pain (LBP) with radiculopathy due to a herniated disc has emerged as a significant impediment to rehabilitation and therapy. Radicular discomfort most commonly arises as a consequence of a herniated lumbar disc. Nevertheless, there remains a degree of uncertainty concerning the root cause of disc protrusion in cases of LBP with radiculopathy. While we have a good understanding of the changes that occur in aging discs, this knowledge doesn't enable us to reliably predict whether a degenerated disc will lead to pain. It is widely acknowledged that the disc tissue in individuals who have undergone discectomies for sciatica exhibits the presence of cytokines and pro-inflammatory mediators. Notably, sequestrated and extruded discs tend to produce higher levels of these mediators compared to specimens with an intact annulus [16-21].

Our research found that the majority of people in the population studied were between the ages of 36 and 45 (35.0 %) and 46 and 55 (33.3 %), followed by those older than 55 (16.7 %) and younger than 35 (25.0 %) (15.0 percent ). According to Bobade et al., the average age was 45 years, however it ranged anywhere from 26 years to 78 years [18]. According to the findings of Hashemi M et al.[16], the average age of the two groups was 49.2 15.5 and 50.5 16 years, respectively. According to the findings of Mondal et al.[17], there were no discernible variations identified in the age distribution of group I compared to group II (42.118.58 years vs. 48.386.39 years). Majority (40.0%) had duration of low backache 4-6 months followed by 7-9 months (30.0%), > 9 months (20.0%) and 1 months -3 months (10.0%). Hashemi M et al [16]. showed that the duration of pain was 8.7±6.5 and 8.7±7.9 months respectively. Schaufele et al. stated that the length of symptoms previous to the injection in either group was not significantly different. e found that ODI score decreased significantly from Immediately to 1 week to 3 weeks to 3 months and 1 year [21]. Hashemi M et al.[16] showed that the mean ODI score for the two groups was also contrasted. At the 4-week follow-up, the mean ODI in PIL group was not statistically differ from that in TF group though there was significant improvement among 2 groups. According to Bobade et al. [18], RMDQ value at study's beginning was 8.64, with males receiving a score of 8.81 and women receiving a score of 8.52. As a result of the TFESI, it was 6.94 after the first two weeks, 5.36 after the first six, and 4 after the first twelve, with a final score of 5.44 at the end of the trial. Using the paired t test, it was shown that between the preinjection values on 6 weeks and 6 months, significant difference was found. According to Kennedy et al. [19], between the baseline and the 6-month follow-up, the ODI indices of either groups swinged from "severe disability" criteria to the "minimal disability" criteria. This change occurred between the two time points (score of 0-20). I.M. shot of steroid or NS was found similarly efficient as TFESI combined with local anaesthesia, local anaesthetia alone, IM injection of NS alone, or TFESI combined with local anaesthesia in prospective RCT conducted by Ghahreman et al [20].

## CONCLUSION

In summary, this study examined patients with lumbar disc herniation and radiculopathy. Most participants were aged 36-55, with slightly more males (55%). Symptom distribution varied, with many experiencing lower back pain and radiculopathy. The majority had symptoms for 4-6 months. Pain severity, assessed using the Visual Analog Score, ranged from moderate to severe. Importantly, the Oswestry Disability Index scores showed a significant improvement over time, suggesting that Transforaminal Epidural Steroid Injections may be effective in managing this condition and enhancing patients' quality of life. Further research is needed to confirm these findings.

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