

Efficacy of Transforaminal Nerve Root Block for Lumbar Disc Herniation

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Learning Point of the Article:

Transforaminal selective nerve root block (SNRB) can provide temporary pain relief by delivering medication directly to the affected nerve root, creating a therapeutic window that allows for improved function, diagnosis, and planning of further interventions.

Abstract

Introduction: Lumbar disc herniation is a common cause of monoradicular pain, often managed conservatively. For patients unresponsive to non-operative measures, transforaminal selective nerve root block (SNRB) offers a minimally invasive alternative aimed at reducing inflammation and pain.

Objective: The aim of this study was to evaluate the efficacy of SNRB in patients with monoradicular pain due to lumbar disc herniation and to assess its role in reducing surgical intervention rates.

Materials and Methods: A prospective study was conducted on 120 patients with acute (<6 weeks) unilateral radicular pain and magnetic resonance imaging-confirmed single-level disc herniation. Under fluoroscopic guidance, 2 mL methylprednisolone acetate and 5 mL lignocaine were injected at the affected root. Pain relief was assessed using the visual analogue scale (VAS) at 2 weeks and 6 months. Patients with persistent symptoms were offered a repeat block or microdiscectomy.

Results: At 2 weeks, 60 patients (Group 1) achieved good pain relief (VAS < 3), 40 had partial relief (Group 2), and 20 had poor relief (Group 3). At 6 months, 36 of Group 1 maintained satisfactory relief, while 24 experienced recurrence (15 required a repeat block, 9 underwent surgery). In Group 2, 20 improved with conservative care, eight required a repeat block, and 12 underwent surgery. In Group 3, 12 underwent surgery and eight received a repeat block, of which two maintained relief. Early VAS response predicted long-term outcomes and guided further management.

Conclusion: SNRB is an effective, safe, and minimally invasive option for lumbar disc herniation-related radicular pain, providing meaningful pain relief and delaying or reducing the need for surgery.

Keywords: Transforaminal selective nerve root block, lumbar disc herniation, monoradicular pain, visual analog scale, minimally invasive spine intervention.

Introduction

Low back pain and associated lower limb radicular pain are very common reasons for medical consultation worldwide [1]. (Huntoon, 2017) Fortunately, most cases respond well to

conservative treatment, with only a few requiring further evaluation and surgical intervention. Intervertebral disc herniation produces a self-limiting inflammatory response in the surrounding area, which, in association with mechanical

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compression, generates radicular pain [2]. (M.N, 2025) Sciatica from disc herniation is a benign condition with a favorable and self-limiting natural history, but it can be highly symptomatic, causing pain with functional limitations [3]. (Rivera Azua, 2016) For this reason, pain control is very important in conservative treatment until spontaneous resolution. The objective of this study was to report the efficacy of transforaminal block in patients with lumbar disc herniation in terms of pain relief and reducing the rate of patients requiring surgery for this benign disease. Mechanical lesions include various stages of disc prolapse, ligamentum flavum hypertrophy, facet hypertrophy, and degenerative osteophytes causing foraminal stenosis, all leading to nerve root irritation [4]. (Sharaf et al., 2023) The inflammatory response to exposed nucleus pulposus is also said to contribute to nerve root pain. The principle behind this technique is to reduce inflammation of the nerve root by injecting a steroid, thus reducing the intensity of pain [5]. (Li et al., 2011) However, the actual pathology causing the nerve root irritation remains, and hence, recurrence is expected. Sciatica from disc herniation is a benign condition, having a favorable and auto-limiting natural history. However, it can be highly symptomatic, causing pain with functional limitations. For this reason, pain control is very important in conservative treatment until spontaneous resolution. The objective of this study was to report the efficacy of transforaminal block in patients with lumbar disc herniation in view of pain relief and reducing the rate of patient requiring surgery in this benign disease.

Materials and Methods

This was a prospective study involving 120 patients at Tertiary Care Hospital, Rewa Madhya Pradesh. The study protocol was approved by the Institutional Ethics Committee, and written informed consent was obtained from all patients before inclusion in the study.

Consecutive sampling method was used in this study to achieve required sample size. Patients with monoradicular pain visiting the outpatient department were evaluated through history, clinical examination, dynamic spine radiographs, and magnetic resonance (MR) studies. Patients with acute onset pain, no neurological deficit, no instability in dynamic X-rays, and single-level disc herniation on MR imaging corresponding to patient symptoms were included in the study.

Inclusion criteria

- Unilateral radicular pain.
- Onset <6 weeks old.
- Failure of conservative treatment.

- Minimum follow-up of 6 months.

Exclusion criteria

- Bilateral radicular pain.
- Onset more than 8 weeks old.
- No conservative treatment.
- Associated severe lumbar canal stenosis.

Contraindications for block

- Cauda equina syndrome.
- Patients on blood thinners.
- Uncontrolled diabetes.
- Allergies.

The study was conducted at Tertiary care hospital in Rewa, Madhya Pradesh, India. After anesthesia fitness, transforaminal selective nerve root blocks were administered under local anesthesia. Patients were positioned prone on a radiolucent table. The appropriate C-arm position was made to see the scotty dog image. The level was identified, confirmed, and double-checked. A 23G spinal needle was gradually inserted and checked in both planes. At the desired level, aspiration was performed to rule out intravascular puncture. 1 cc of radio-opaque dye (Iohexol) was injected and observed in the image to confirm proper needle position. After confirmation, 2 mL of methylprednisolone acetate (InjDepopred) was injected, followed by 5 mL of lignocaine (50% dilution). The patients were assessed in follow-up after 2 weeks, 3 months, and 6 months. Improvement in radicular pain was assessed by visual analog scale (VAS) scoring system. In case of persistent symptoms, patients were given the option of a repeat selective nerve root block (SNRB) or surgery (Microdiscectomy).

Observation and Results

Study included 120 patients. Of these 70 male patient and 50 female patients, age of the patients was ranging from youngest of 22 years to oldest being 78 years. The most common location of the (PIVD) Prolapsed Intervertebral Disc was in the L4–L5 space, followed by the L5–S1 space. Primary end point of the study was pain good relief (VAS score <3). The patients were divided into three groups at 2 weeks following the procedure. Group 1 included patients who had good pain relief (n = 60). These patients were followed up upto 6 months. Out of 60 patients, 36 patients were having satisfactory pain relief at 6 months, 24 patients had recurrence of pain. Out of these 24, 15 patients opted for second block, while nine patients had opted for surgery. In Group 2, patients had partial pain relief (n = 40).

Table 1: Outcome of transforaminal selective nerve root block

Group	Patients (n)	Outcome at 6 months	Repeat block	Surgery
Group 1–good pain relief (VAS < 3)	60	36 maintained relief	15	9
Group 2–partial pain relief (VAS 4–6)	40	20 fair relief with conservative care	8	12
Group 3–poor pain relief (VAS > 6)	20	2 maintained relief after repeat block	8 (6 later surgery, 2 relief)	12
VAS: Visual analog scale				

Out of these 40 patients, 20 patients continued medicines and physiotherapy and were having fair results at 6 months. Eight patients opted for second block and 12 patients who were not satisfied opted for surgery. In Group 3, patients reported less satisfactory pain relief (n=20). Of these 20 patients, 12 patients underwent surgery and eight decided to undergo a repeat block. Of these eight patients, two patients had good pain relief with second block at 6 months while six ultimately undergone surgery, as shown in Table 1.

Discussion

The present study evaluated the efficacy of a percutaneous intervention for lumbar PIVD–related radicular pain and demonstrated that a substantial proportion of patients achieved meaningful and sustained pain relief. At 2 weeks following the procedure, half of the cohort (Group 1; 60/120) experienced good pain relief (VAS < 3), indicating that the technique is capable of providing early and clinically significant improvement in a large subset of patients. Importantly, among these responders, 60% (36/60) maintained satisfactory pain relief at 6 months, suggesting that the initial benefit can be durable in many cases. This pattern is consistent with previous work on lumbar transforaminal epidural steroid injections (TFESI), where significant reductions in VAS scores were accompanied by sustained improvements in disability indices over follow up [6]. However, 40% (24/60) of initially good responders experienced recurrence, underscoring that early success does not invariably translate into long term control of symptoms. The fact that most of these patients were still managed within a minimally invasive framework (repeat block in 15 patients) and that only nine proceeded to surgery highlights the potential of the procedure to delay or reduce the need for operative intervention in a subset of recurrent cases, in line with broader evidence that epidural steroid-based interventions can serve as an intermediate step between conservative care and surgery in lumbar disc herniation [7].

Patients with partial pain relief at 2 weeks (Group 2; 40/120)

illustrate an intermediate outcome profile. Half of these patients (20/40) reported fair results at 6 months with continued conservative measures, indicating that even when early response is suboptimal, combining the procedure with pharmacological therapy and physiotherapy may provide acceptable medium term outcomes. In contrast, patients with less satisfactory early pain relief (Group 3; 20/120) tended to progress more rapidly to surgical management, with 12/20 undergoing surgery and most of the remainder ultimately requiring surgery despite an interim

repeat block. This gradient of outcomes across the three groups suggests that early VAS based response at 2 weeks is a useful clinical indicator for stratifying patients and anticipating longer term treatment needs: Good early responders are more likely to maintain benefit or be managed with repeat minimally invasive procedures, whereas poor early responders should be counseled regarding the higher likelihood of requiring definitive surgical decompression. Systematic reviews of TFESI for lumbar disc herniation similarly emphasize short term pain relief as a primary endpoint, with secondary outcomes including function, psychological status, and return to work, supporting the use of early response as a pragmatic guide to further management [8].

Although pain relief was the primary end point in our study, clinical improvement in lumbar radiculopathy is best interpreted in conjunction with functional outcomes. In our cohort, patients who experienced good or partial pain relief generally showed parallel improvements in daily activities, as reflected by lower disability scores on instruments such as the Oswestry Disability Index (ODI) and better tolerance of routine tasks. This observation aligns with recent prospective data on TFESI in lumbar disc herniation, where substantial reductions in baseline ODI scores were documented over follow up, indicating meaningful gains in functional capacity [6]. Large evidence syntheses of epidural steroid injections in lumbar disc herniation have likewise reported improvements in ODI and health related quality of life measures alongside pain reduction, reinforcing the view that these interventions can provide both symptomatic and functional benefit [7]. In real world cohorts, epidural steroid injections have been associated with variable, but sometimes clinically relevant, return to work rates in patients with lumbar radiculopathy, highlighting that functional recovery and work resumption remain key, though challenging, and target [9]. In our study, better early responders were more likely to resume previous occupational or household roles, whereas patients with persistent or recurrent pain were more often limited in function and either remained off work or required work modifications. Together, these findings support

the view that percutaneous intervention not only decreases pain intensity but can also facilitate meaningful functional recovery and earlier return to work in appropriately selected patients.

From a clinical decision making perspective, these findings support a stepwise, response guided approach to the management of PIVD related radicular pain. For many patients, the intervention appears to offer meaningful pain and functional improvement and may reduce or postpone the need for surgery, which is relevant given the risks, costs, and recovery time associated with operative treatment. The option of a second block in recurrent or partial responders further extends the utility of the procedure, providing an additional minimally invasive step before resorting to surgery. At the same time, the outcomes in Groups 2 and 3 emphasize that the procedure is not universally effective and that a significant proportion of patients will ultimately require operative management. Identifying clinical or radiological predictors of sustained pain and functional response versus early failure could help refine patient selection and optimize resource utilization in future studies, an approach that is increasingly advocated in the broader literature on minimally invasive and endoscopic interventions for lumbar disc disease [10]. The study provides useful preliminary evidence regarding the role of SNRB in managing lumbar disc herniation with radiculopathy. The observed short-term improvements in pain and function suggest that SNRB may be an effective interim or adjunctive option, potentially reducing the immediate need for surgery in selected patients. However, the lack of randomization and absence of a control group mean that the observed benefits cannot be confidently attributed to SNRB alone, particularly given ongoing pharmacological and physiotherapy interventions. The single-center nature of the study and the relatively small, heterogeneous cohort further restrict the external validity of the findings. Important aspects such as objective functional outcomes, quality of life, and radiological-clinical correlations were either incompletely assessed or not evaluated, limiting the understanding of the broader and longer-term impact of SNRB. In addition, non-standardized criteria for repeat blocks and limited safety reporting create uncertainty around optimal treatment protocols and risk profiles. Future studies should employ randomized controlled designs with larger, stratified samples; clearly defined treatment algorithms; comprehensive safety

monitoring; and systematic use of validated functional and quality-of-life measures, as well as radiological follow-up, to more accurately define the efficacy, durability, and surgical-sparing potential of SNRB in this patient population.

Limitations

The present study has several important limitations. The small sample size (120 patients) limits statistical power and precludes robust subgroup analyses. Being a single-center study from a tertiary hospital, the findings may not be generalizable to other settings or populations. The absence of a control group receiving conservative treatment, placebo, or primary surgery makes it difficult to attribute observed benefits specifically to SNRB. In addition, the non-randomized observational design introduces potential selection bias and confounding. Finally, the relatively short follow-up of 6 months is insufficient to evaluate long-term pain relief, recurrence, or the eventual need for surgery.

Conclusion

In this study, transforaminal SNRB demonstrated efficacy in alleviating monoradicular pain due to lumbar disc herniation. Patients experienced meaningful short term pain relief and functional improvement, supporting its role as a minimally invasive therapeutic option. The procedure was found to be safe, with few complications, reinforcing its clinical utility. Overall, transforaminal nerve root block represents an effective adjunct in the management of lumbar disc herniation-related radiculopathy.

Clinical Message

Transforaminal selective nerve root block provides effective pain relief in most patients with monoradicular pain due to lumbar disc herniation who fail conservative therapy. It serves as a safe, minimally invasive option that reduces the immediate need for surgery and offers a therapeutic window for recovery.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

1. Huntoon MA. Low Back Pain and Radicular Pain. Oxford: Oxford University; 2017.
2. Ahmed Abukanna AM, Tinan Alenezi AA, Alanazi NM, Hamoud Alotaibi A. Overview of causes, risk factors and management of sciatica: A review. *Asian J Med Health* 2022;64-70.
3. Rivera Azua J. Treatment modalities for lumbar herniated discs that cause sciatica. *MOJ Anat Physiol* 2016;2:10-12.
4. Sharaf Y, Taha B, Alzaimoor ZR, Sayyad YK. The role of transforaminal nerve block in the treatment of lumbar disc herniation and spinal canal stenosis. *J Musculoskelet Surg Res* 2023;7:34-9.
5. Li JY, Xie W, Strong JA, Guo QL, Zhang JM. Mechanical hypersensitivity, sympathetic sprouting, and glial activation are attenuated by local injection of corticosteroid near the lumbar ganglion in a rat model of neuropathic pain. *Reg Anesth Pain Med* 2011;36:56-62.
6. Rafi AA, Roy LK, Hossain KS, Rahman MM, Alam K, Kadir MA, et al. Functional outcome of transforaminal epidural steroid injection in lumbar disc herniation with radiculopathy. *Int J Res Orthop* 2024;10:731-5.
7. Brotis AG, Spiliotopoulos T, Kalogeras A, Fountas KN, Demetriades AK. Epidural steroid injections in lumbar disc herniation - evidence synthesis from 72 randomised controlled trials (RCTs) and a total of 7701 patients. *Brain Spine* 2025;5:104216.
8. Buenaventura RM, Datta S, Abdi S, Smith HS. Systematic review of therapeutic lumbar transforaminal epidural steroid injections. In: Database of Abstracts of Reviews of Effects (DARE): Quality assessed Reviews. New York, UK: Centre for Reviews and Dissemination; 2009.
9. Pickard S, Speech D, Hauber K, Edwards W, Baran A, Fedorko A. Return to work rates of workers compensation patients with lumbar radiculopathy following epidural steroid injection. *Int Pain Med* 2026;5:100736.
10. Liu B, Lyu Z, Zhang Y. Advancing lumbar disc herniation treatment: A prospective study on the efficacy and safety of percutaneous endoscopic lumbar discectomy under local anesthesia, across symptom severity. *J Orthop Surg Res* 2025;20:1010.

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