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EFFICACY OF SELECTIVE NERVE ROOT BLOCK IN ACUTE LUMBAR DISC HERNIATION: A PROSPECTIVE OBSERVATIONAL STUDY

Orthopaedics

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ABSTRACT

Background: Acute lumbar disc herniation (LDH) causes radicular pain often refractory to conservative management. Selective nerve root block (SNRB) delivers local anaesthetic and corticosteroid directly to the inflamed nerve root under fluoroscopic guidance, interrupting nociceptive signals and reducing inflammation. **Objective:** To evaluate pain relief, functional improvement, opioid‑sparing effects, and safety of fluoroscopy‑guided SNRB in acute LDH. **Methods:** A prospective single‑centre study enrolled 100 patients (mean age 45 ± 10 years; 54 M/46 F) with MRI‑confirmed acute LDH and radicular pain (VAS ≥ 6)was done in Department of Orthopaedics Birrd Trust Hospital between November 2024-November 2025. Each received a single‑level SNRB (2 mL 0.5% bupivacaine + 40 mg triamcinolone). Outcomes at baseline, 1 week, and 4 weeks included VAS, Oswestry Disability Index (ODI), SF-36 Physical Component Summary (PCS), daily opioid consumption, patient satisfaction, and adverse events. Paired t-tests assessed changes ($\alpha = 0.05$). **Results:** Mean VAS decreased from 7.8 ± 1.2 at baseline to 3.2 ± 1.1 at 1 week and 2.1 ± 0.9 at 4 weeks ($p < 0.001$). ODI improved from 55 ± 10% to 30 ± 8% ($p < 0.001$). SF-36 PCS increased from 35 ± 6 to 48 ± 5 ($p < 0.001$). Daily opioid use fell from 30 ± 12 MME to 12 ± 6 MME ($p < 0.001$). Satisfaction was excellent/good in 82%. No serious adverse events occurred. **Conclusion:** Fluoroscopy‑guided SNRB provides rapid, significant pain relief, functional gains, and opioid‑sparing benefits in acute LDH with minimal risk.

KEYWORDS

INTRODUCTION

Lumbar disc herniation (LDH) affects 2–3% of adults annually, often presenting with acute radicular pain and functional impairment[1]. Radicular symptoms result from mechanical compression and inflammatory mediators acting on the dorsal root ganglion[2]. While conservative measures (NSAIDs, physical therapy, oral steroids) succeed in most cases within six weeks[3,4], a subset remains refractory, impacting quality of life and healthcare utilization[5].

Selective nerve root block (SNRB) under fluoroscopic guidance delivers a local anaesthetic to block sodium channels in C-fibres and corticosteroid to inhibit phospholipase A and pro-inflammatory cytokines near the nerve root[6,7]. Prior studies in mixed chronic and acute radiculopathy report meaningful reductions in pain and disability[8–10], but data specific to acute LDH are limited. This study prospectively evaluates the real-world effectiveness and safety of SNRB in acute LDH.

METHODS

Study Design and Participants

- Prospective, single-centre cohort study was done in Department of Orthopaedics Birrd Trust Hospital between (November 2024–November 2025).
- Inclusion: age 18–65; MRI-confirmed single-level posterolateral LDH; radicular VAS ≥ 6; symptom duration < 6 weeks.
- Exclusion: progressive motor deficit; prior lumbar surgery or injection at index level; coagulopathy; infection; allergy to study drugs.

Intervention

Under sterile conditions with the patient prone, an 18 G spinal needle was advanced to the neural foramen under anteroposterior and lateral fluoroscopy. After negative aspiration, 2 mL 0.5% bupivacaine mixed with 40 mg triamcinolone acetonide was injected perineurally. Patients were monitored for 30 minutes post-procedure.

Outcome Measures

- **Primary:** Change in VAS from baseline to 4 weeks.
- **Secondary:** VAS at 1 week; change in ODI and SF-36 PCS baseline→4 weeks; daily opioid use (MME); patient satisfaction (4-point Likert); adverse events.

Statistical Analysis

Sample size (n=100) provided 90% power to detect a 3-point VAS change (SD 2.0) at α=0.05. Continuous data are mean ± SD; categorical as n (%). Paired t-tests compared baseline and follow-up values.

RESULTS

Patient Characteristics

Characteristic	Value (n=100)
Age (years)	45 ± 10
Sex (M/F)	54 / 46
Symptom duration (days)	28 ± 8
Affected level (L4–L5/L5–S1)	60 / 40
Baseline VAS	7.8 ± 1.2
Baseline ODI (%)	55 ± 10
Baseline SF-36 PCS	35 ± 6
Baseline opioid use (MME/day)	30 ± 12

Pain and Functional Outcomes

Time point	VAS	ODI (%)	SF-36 PCS	Opioid Use (MME/day)
Baseline	7.8 ± 1.2	55 ± 10	35 ± 6	30 ± 12
1 Week	3.2 ± 1.1*	—	—	18 ± 8*
4 Weeks	2.1 ± 0.9*	30 ± 8*	48 ± 5*	12 ± 6*

*$p < 0.001$ vs. baseline

Patient Satisfaction and Safety

- Excellent: 45%
- Good: 37%
- Fair: 12%
- Poor: 6%

Minor transient events: injection-site soreness (10%), headache (3%). No dural puncture, infection, motor deficit, or hematoma.

DISCUSSION

This prospective cohort demonstrates that fluoroscopy-guided SNRB in acute LDH yields rapid and sustained pain relief (mean VAS reduction 5.7 points) and functional improvement (ODI drop 25%, SF-36 PCS rise 13 points) at 4 weeks. A 60% reduction in opioid use further supports its role in multimodal analgesia and opioid-sparing strategies[11]. Satisfaction (82% excellent/good) parallels outcomes in chronic cohorts[8–10].

Mechanistically, perineural corticosteroid reduces inflammatory cytokines (IL-1β, TNF-α), while local anaesthetic blocks ectopic nerve

discharges[7,13]. Early intervention may shorten recovery, reduce opioid exposure, and potentially defer surgery[5,14].

Limitations: Non-randomized design, no control group, short-term follow-up, and single injection protocol. Long-term outcomes and comparative trials are needed.

CONCLUSION

Fluoroscopy-guided SNRB is a safe, effective minimally invasive adjunct for acute LDH, providing rapid pain relief, functional gains, and opioid-sparing effects with minimal complications. It should be considered early in patients with severe radicular pain refractory to initial conservative care.

REFERENCES

1. Bogduk N. Lumbar discogenic pain: state of the art review. Pain Med. 2005;6(5):239–253.
2. Olmarker K, Rydevik B. Immune response in experimental nerve root compression. Spine. 1991;16(5):297–302.
3. Airaksinen O, Brox JI, Cedraschi C, et al. European guidelines for management of nonspecific low back pain. Eur Spine J. 2006;15 Suppl 2:S192–300.
4. Manchikanti L, Boswell MV, Singh V, et al. Evidence based guidelines for interventional techniques in chronic spinal pain. Pain Physician. 2009;12(4):699–802.
5. Kwon BK, Oxland TR, Tetzlaff W, et al. Functional recovery following lumbar nerve root injection. Spine J. 2011;11(10):963–970.
6. Lord SM, Barnsley L, Wallis BJ, et al. Corticosteroid injection in chronic lumbar radiculopathy: randomized trial. Spine. 1996;21(15):1876–1881.
7. Galen LA, Rowbotham MC. Analgesic mechanisms of corticosteroids. Reg Anesth Pain Med. 2000;25(1):1–9.
8. Carpenter RL, Caplan RA, Brown DL, et al. Incidence and risk factors for side effects of epidural steroids. Anaesthesiology. 1992;76(6):1005–1011.
9. Rathmell JP, Benzon HT. Interventional approaches for lumbar radiculopathy. Tech Reg Anesthesia Pain Management. 2010;14(4):178–183.
10. Hong CH, Park KW, Kim DH, et al. Long-term effects of selective nerve root block. J Korean Neurosurg Soc. 2010;48(4):372–378.
11. Chou R, Turner JA, Devine EB, et al. The effectiveness and risks of long term opioid therapy for chronic pain: systematic review. Ann Intern Med. 2015;162(4):276–286.
12. Liu Y, Wang T, Zhang Y, et al. Selective nerve root block vs. epidural injection for sciatica: systematic review & meta analysis. Pain Physician. 2022;25(2):123–134.
13. Martínez Lage JF, Martínez AS, Flores Le Roy C. Mechanisms of nerve root compression injury. Acta Neurochir (Wien). 1997;139(4):286–291.
14. Brisby H. Pathophysiology of disc degeneration: a literature review. J Spine. 2014;3(3):125–130.