

Epidural Steroid Injection and Nerve Root Block for Lumbar Radicular Pain

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ABSTRACT

Background: Low back pain combined with radicular pain remains one of the most challenging musculoskeletal problems for its therapeutic management. Conservative treatment, percutaneous spine interventions and surgery have all been used as treatments; and the treatment that is chosen depends on the severity of the clinical and neurologic presentation. Many medical professionals currently use epidural steroid injections for the treatment of lumbosacral radiculopathy.

Methods: A prospective study was conducted over one year at Dr. B.R. Ambedkar Medical College and Hospital, involving 70 patients of either gender with lumbar radiculopathy. Pre-procedure evaluation was done and patients were made fit for the procedure Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) score was assessed followed by assessment using the Oswestry Disability Index (ODI). Half of the sample patients were administered epidural steroid injections, remaining half were chosen for selective nerve root block procedure Follow-up of the patients was done at 1, 3 and 6 months, post-procedure and assessed using the Oswestry Disability Index (ODI) questionnaire.

Results: Out of the 70 patients, 41 (58.5%) were male and 29 (41.5%) were female. The distribution of age of the patients was 30–70 years. Duration of symptoms at presentation ranges from 1 to 10 months with an average of 4.10 (± 3.13) months. L4L5 (72.8%) level was the most common level involved followed by L5S1 (18.5%), both L4L5/L5S1 together (7.1%) and L3L4 (1.4%).

Conclusions: Epidural steroid injection is an easy and safe method with better pain relief and improvement of functional disability than nerve root block. The effect of nerve root block is short-acting in most of the patients and recurrence is repeated in some. It does not alter the prognosis of those specially with severe symptoms.

Key-words: Lumbar Radicular Pain, Nerve Root Block, Epidural Steroid Injection

INTRODUCTION

Low back pain combined with radicular pain remains one of the most challenging musculoskeletal problems for its therapeutic management. ^[1] This malady results from nerve root impingement and/or inflammation that causes neurologic symptoms in the affected nerve root(s) distribution. ^[2]

Conservative treatment, percutaneous spine interventions and surgery have all been used as treatments; and the treatment that's chosen depends on the severity of the clinical and neurologic presentation. ^[3] Many medical professionals currently use epidural steroid injections for the treatment of lumbosacral radiculopathy. Performing "blind" epidural steroid injection lacks target specificity and often results in incorrect delivery of medication to the lesion. ^[3] Imaging-guided steroid injections are now becoming more popular despite the controversy regarding their efficacy. ^[4] The term transforaminal epidural injection has been incorrectly referred to as selective epidural injections, selective nerve root blocks or nerve root sleeve

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injections. Additionally, the interlaminar epidural injections have been referred to as the translaminar epidural injections.^[5]

The epidural space has been accessed inferiorly through the caudal approach or posteriorly through the interlaminar approach, and often without employing fluoroscopy.^[6] Both the interlaminar and caudal epidural injections require relatively large volumes of injections for delivering steroids to the target site. This has the risk of extra-epidural and intravascular needle placement. A transforaminal epidural steroid injection (TFESI) using a small volume of local anesthetic anesthetized the spinal nerve and partially anesthetize the dura, the posterior longitudinal ligament, the intervertebral disc and the facet joint. For these reasons, fluoroscopy-guided TFESI has become the preferred approach to the epidural space.^[7]

When the conventional TFESI technique is employed, a spinal needle is positioned within the "safe triangle" with the bevel below the inferior aspect of the pedicle. A safe triangle is described with the sides corresponding to the horizontal base of the pedicle, the exiting nerve root and the posterolateral border of the vertebral body.^[8] In most cases of lumbosacral radiculopathy that are secondary to spinal stenosis or disc herniation, the site of impingement can lie at the level of the supra-adjacent intervertebral disc, which is rostral to the conventional lumbar TFESI bevel position.^[9]

By utilizing the preganglionic approach to TFESI, the theoretical benefits are placing the injectant closer to the site of neural impingement to create a more effective washout of the related inflammatory disc material.^[10] The effectiveness of TFESI with using a preganglionic approach for lumbar radiculopathy when the nerve root compression is located at the level of the supra-adjacent intervertebral disc.

MATERIALS AND METHODS

Place of study- This prospective study was conducted in the Dr. B.R. Ambedkar Medical College and Hospital over 1 year. 70 patients of either gender with lumbar radiculopathy.

Inclusion criteria

- Recurrent intermittent claudication pain
- Inflammation-induced pain
- ≤3 months history of radiating pain to the lower limbs

- Straight leg raising test (SLRT) within 30 to 60 degrees
- LANSS score >12
- Lumbar MRI showing lumbar stenosis at single-level
- Patients not willing to surgical intervention

Exclusion criteria

- Patient is not willing for the procedure
- Patient allergies to drugs to be used
- Patients without radiating pain
- Non-co-operative patients during the procedure
- Systemic infections
- Pregnancy
- Severe respiratory or cardiovascular disease
- Immuno-suppression

Research Design- Patients who have failed adequate multimodal non-invasive measures for control of lumbar radicular pain due to intervertebral disc degeneration causing spinal canal/neural foraminal narrowing without motor deficit or bladder/bowel disturbance were treated with Transforaminal epidural steroid injection. Patients with motor deficits, bladder/bowel disturbances or not consenting for TFESI were excluded from the study.

Patients were given a combination of 40 mg depo-medrol & 0.25% bupivacaine epidurally, under C-arm guidance. The patient's pre- and post-procedural pain was compared using Wong-Baker's faces pain scale. The data were collected from the hospital's Digital Medical Record Department. The patient's pain status was assessed at 1 month, 6 months and 1 year of discharge.

The awake patient was positioned prone and through 'C' arm guidance a 22G needle of 10 cm length with its tip slightly angled was inserted after infiltrating the skin and subcutaneous tissues with local anesthetic agents. The needle was positioned in such a way that in lateral view, the tip was in the postero superior quadrant of the neural foramen and AP view the tip was in subpedicular region at 6'o clock position. Iodine contrast was injected to confirm the position of the needle.

2 ml of methylprednisolone (depo-medrol 40 mg) + 2 ml of 0.25% bupivacaine injection was injected slowly. The patient may develop transient dermatomal parasthesia but motor functions were not impaired. The needle was removed and sterile compression dressing was applied. This procedure can be done unilaterally, bilaterally or at multiple levels based on clinic-radiological correlation.

Pre- and post-procedural pain were assessed using Wong-Baker's FACES pain rating scale and compared for any significant changes. The patients were observed and on symptomatic improvement with no complications, they were discharged the next day.

RESULTS

Out of the 70 patients, 41 (58.5%) were male and 29 (41.5%) were female. The distribution of age of the patients was 30–70 years. Duration of symptoms at presentation ranges from 1 to 10 months with an average of 4.10 (± 3.13) months (Table 1).

Table 1: Age of patients and duration of symptoms

	No. of patients	Minimum	Maximum	Mean
Age (years)	70	30	70	51.23
Duration of symptoms (years)	70	1	10	4.32

Table 2: Distribution of Gender

Gender	No. of patients	Percentage (%)
Male	41	58.57
Female	29	41.42

In Table 3, L4L5 (72.8%) level was the most common level involved followed by L5S1 (18.5%), both L4L5/L5S1 together (7.1%) and L3L4 (1.4%) (Table 2).

Table 3: Level of the spine involved

Level	No. of patients	Percentage (%)
L4L5	51	72.8
L5S1	13	18.5
L4L5/L5S1	5	7.1
L3L4	1	1.4

Wong-Baker's faces pain scale/Visual analogue scale (VAS) was assessed in the pre & post-procedure period (Table 4 & Table 5) and compared.

Table 4: Pre-procedure pain scale.

Wong-Baker's faces-pain scale	No. of patients	Percentage (%)
6	7	11.9
7	27	45.8

8	22	37.3
9	3	5.1

Table 5: Post-procedural (day 1) pain scale

Wong-Baker's Faces Pain scale	No. of patients	Percentage (%)
0	53	75.7
1	13	18.5
2	3	4.2
7	1	1.4

DISCUSSION

The main advantage of the preganglionic approach over the conventional technique is the accurate delivery of medications to the target site. This requires the use of imaging-guided transforaminal access to the side at the level of the nerve impingement and a preinjection test, with the demonstration of the flow of the contrast medium to the target tissue. This often requires changing the direction of the needle for correct placement.^[11] The authors of the above study attempted to use a modified approach based on the Lew *et al.* technique.^[12] They have done a superb job in comparing the two approaches of TFESI. They should be commended for their efforts in providing the basis for a future prospective study for the treatment of lumbosacral radiculopathy.^[13]

A future, controlled, prospective study needs to be designed with a consensus opinion on the effective route of administration, the timing of injection, the follow-up periods and the outcome measurement using both subjective and objective scales. It is hoped that a prospective, clinical trial with this newer approach will define the clinical utility and effectiveness of the preganglionic TFESI.^[14]

Is an injection of corticosteroid into the epidural space an effective means of controlling subjective complaints and improving objective measures? In the literature, the efficacy of lumbar epidural injections for radicular pain lasts for less than 3 months. Ridley *et al.* reported that the therapeutic benefits disappeared within 6 months of the treatment.^[15] However, Lutz *et al.*^[15] reported the therapeutic long-term effects (75.4%) of TFESI at an average follow-up of 20 months.

Several studies have suggested that TFESI is effective in treating radicular pain. A randomized trial of TFESI

should compare alternative therapies, including conservative treatment, surgical decompression or the interlaminar steroid injection approach. Thomas *et al.* have reported that TFESI showed significantly better results on days 6 and 30 and at 6 months as compared with the blindly performed interlaminar approach. [16] Manchikanti *et al.* found that transforaminal injections were the most effective with the least expense when compared with blind interlaminar injection and the caudal approach under fluoroscopy. [17]

Epidural steroid injections and selective nerve root blocks have been used for spinal pain management for many years. A major criticism of most of the early studies done on epidural steroid efficacy is their use of "blind" approaches and therefore, their lack of target specificity. Even in experienced hands, blind epidural injections result in incorrect placement of the injectant in up to 30% of the cases. [18] The newer minimally invasive, imaging-guided percutaneous techniques with fluoroscopy or computed tomography have recently been added to the list of available treatment options for spinal pain. [19].

CONCLUSIONS

The study has concluded that epidural steroid injection is an easy and safe method, providing superior short-term, midterm, and long-term pain relief and significant improvement in functional disability compared to selective nerve root block in cases of lumbar radiculopathy. The selective nerve root block, while effective for immediate pain relief, demonstrated a shorter duration of action in most patients, with a tendency for symptom recurrence in some cases. These findings highlight the potential of epidural steroid injections as a more reliable and sustainable treatment option for managing lumbar radiculopathy. Further research may help optimize treatment protocols and better address individual patient needs.

CONTRIBUTION OF AUTHORS

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