

## Original Research Article

# Clinical effectiveness of selective nerve root block in lumbar radiculopathy

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## ABSTRACT

**Background:** Epidural steroid injections (ESIs) have been used as an adjunct in the treatment of sciatica. Since the early reports, success rates ranging from 18% to 90% (average, 67%) have been documented. However, the efficacy of ESI has lasted, on the average, less than 3 months.

**Methods:** This study was conducted at Abrol medical centre, Punjab from June 2019 to June 2020. One hundred patients with back pain documented with lumbar disc disease treated initially with rest, analgesics and physiotherapy for at least six weeks were included in the study and treated with transforaminal epidural steroid injection. The protocol of the study was approved by ethical committee. Patients to be participated in this study were documented. Patients with lumbar disc disease were given transforaminal epidural steroid injection in Orthopaedics operation theatre of our institute. Informed and written consent were obtained as per ethical committee guidelines.

**Results:** Pre-procedure Roland Morris disability mean score was 17.54 and it got reduced to 5.57 by 4<sup>th</sup> day immediately post injection, was 6.44 by 6 weeks, by 3<sup>rd</sup> month 7.1 and by end of 6 months it was 8.34. Improvement in score on 4<sup>th</sup> day post injection was 68.24 percent which is considered significant and successful.

**Conclusions:** Transforaminal epidural steroid treatment better medication for pain relief, patient satisfaction, disability improvement and functional improvement.

**Keywords:** Tranforaminal epidural, Steroids, Pain

## INTRODUCTION

Currently variety of non-operative therapies for back and leg pain are available. They are simple rest, exercises, massage, heat therapy, traction therapy.

Epidural steroid injections (ESIs) have been used as an adjunct in the treatment of sciatica. Since the early reports, success rates ranging from 18% to 90% (average, 67%) have been documented. However, the efficacy of ESI has lasted, on the average, less than 3 months.<sup>1</sup>

In recent years, understanding of disc degeneration has undergone a significant transformation. Impairments of the back and spine are ranked as the most frequent cause

of limitation of activity in individuals younger than 45 years old by the National Center for Health Statistics.<sup>2</sup>

Epidural injections in the cervical, thoracic, and lumbosacral spine were developed to diagnose and treat spinal pain. Structural abnormalities do not always cause pain, and diagnostic injections can help to correlate abnormalities seen on imaging studies with associated pain complaints. In addition, epidural injections can provide pain relief during the recovery of disc or nerve root injuries and allow patients to increase their level of physical activity. Because severe pain from an acute disc injury with or without radiculopathy often is time limited, therapeutic injections help to manage pain and may alleviate or decrease the need for oral analgesics.

## METHODS

### Study design

This study was conducted at Abrol medical centre, Punjab from June 2019 to June 2020. One hundred patients with back pain documented with lumbar disc disease treated initially with rest, analgesics and physiotherapy for at least six weeks were included in the study and treated with transforaminal epidural steroid injection. The protocol of the study was approved by ethical committee. Patients to participate in this study were documented. Patients with lumbar disc disease were given transforaminal ESI in orthopaedics operation theatre of our institute. Informed and written consent were obtained as per ethical committee guidelines.

### Type of study

The type of study was prospective cohort study.

### Inclusion criteria

Patients fulfilling following criterias were included in the study- (a) patients with duration of back pain and radiculopathy for more than 6 weeks; (b) MRI scan showing an herniated nucleosus pulposus (HNP) of intervertebral disc with less than 50% intervertebral canal

narrowing with manifestations radiculopathy; and (c) age group between 18 to 60 years.

### Exclusion criteria

Patients with (a) more than 2 level lumbar disc disease; (b) those with bilateral symptoms, multiple nerve root involvement and neurological weakness; (c) patients with progressive neurological deficits; (d) patients with a large herniation with severe central or foraminal stenosis on MRI; (e) coagulation disorder; and (f) patients with a history of anaphylaxis to local anesthetics or corticosteroid were excluded from the study.

### Data analysis

Data was recorded as per performa. The data analysis was computer based; SPSS-22 was used for analysis. For categoric variables chi-square test was used. For continuous variables independent samples's t-test was used. P value <0.05 was considered as significant.

## RESULTS

A total of 100 patients meeting the criteria were included in the study. As depicted in histogram and table, 58 out of 100 patients belongs to 41-50 years age group. Out of 100 pateints, the sample consists of 62 females and 38 males patients.

**Table 1: Based on MRI diagnosis using MSU grading.**

Valid	Frequency	Percent (%)	Valid percent (%)	Cumulative percent (%)
<b>Mild</b>	67	67.0	67.0	67.0
<b>Moderate</b>	16	16.0	16.0	83.0
<b>Severe</b>	17	17.0	17.0	100.0
<b>Total</b>	100	100.0	100.0	

Out of 100 patients in our study 67% patients had mild, 16% patients had moderate and 17% patients had severe

PIVD according to MSU grading of prolapsed disc based on MRI diagnosis of every patient.

**Table 2: For side of radiculopathy.**

Valid	Frequency	Percent (%)	Valid percent (%)	Cumulative percent (%)
<b>Left</b>	43	43.0	43.0	43.0
<b>Right</b>	57	57.0	57.0	100.0
<b>Total</b>	100	100.0	100.0	

In our study, out of 100 patients 57% patients had right sided radiculopathy with no cases having bilateral

radiculoapthy. Unilateral two level (but not more than two) nerve root involvement was included in study.

**Table 3: For side of radiculopathy.**

Valid	Frequency	Percent (%)	Valid percent (%)	Cumulative percent (%)
<b>L4</b>	11	11.0	11.0	11.0
<b>L4, L5</b>	3	3.0	3.0	14.0
<b>L5</b>	51	51.0	51.0	65.0
<b>L5, S1</b>	7	7.0	7.0	72.0
<b>S1</b>	28	28.0	28.0	100.0
<b>Total</b>	100	100.00	100.00	

Out of 100 patients in our study 51% patient had L5 root involved followed by 28% S1 root involvement. Both L5 and S1 roots was involved in 7% cases and both L4, L5

roots was involved in 3% but having only unilateral side radiculopathy. Isolated L4 nerve root involvement was relatively very less i.e.; 11%.

**Table 4: VAS score mean analysis in TFESI patients.**

Score	VAS	
<b>At presentation</b>	Mean	7.89
	N	100
	SD	0.79
	Median	8
<b>At 4 days</b>	Mean	1.59
	N	100
	SD	0.83
	Median	2
<b>At 6 weeks</b>	Mean	1.39
	N	90
	SD	0.944
	Median	1
<b>At 3 months</b>	Mean	1.3
	N	90
	SD	0.988
	Median	1
<b>At 6 months</b>	Mean	2.13
	N	90
	SD	0.851
	Median	2

In TFESI, the visual numeric pre-procedure mean was 7.89 and after procedure it got reduced to 1.59 on 4<sup>th</sup> day immediately, 1.39 by end of 6 weeks, was 1.3 by 3<sup>rd</sup> month and by 6 months it was 2.13. Fifty percent mean reduction

was noticed at 4<sup>th</sup> day. Out of 100 patients, excellent response were noted in 45 patients, very good response in 42 patients, good response in 8 patient.

**Table 5: of RMDQ mean score analysis.**

Score	RMQD	
<b>At presentation</b>	Mean	17.54
	N	100
	SD	2.101
	Median	18
<b>At 4 days</b>	Mean	5.57
	N	100
	SD	3.543
	Median	4
<b>At 6 weeks</b>	Mean	6.44
	N	90
	SD	3.748
	Median	5
<b>At 3 months</b>	Mean	7.1
	N	90
	SD	3.909
	Median	6
<b>At 6 months</b>	Mean	8.34
	N	90
	SD	4.338
	Median	7

Pre-procedure Roland Morris disability mean score was 17.54 and it got reduced to 5.57 by 4<sup>th</sup> day immediately post injection, was 6.44 by 6 weeks, by 3<sup>rd</sup> month 7.1 and

by end of 6 months it was 8.34. Improvement in score on 4<sup>th</sup> day post injection was 68.24 percent which is considered significant and successful.

**Table 6: ODI mean score analysis.**

Score	ODI	
<b>At presentation</b>	Mean	29.83
	N	100
	SD	3.178
	Median	28
<b>At 4 days</b>	Mean	2.97
	N	100
	SD	0.904
	Median	3
<b>At 6 weeks</b>	Mean	2.94
	N	90
	SD	0.725
	Median	3
<b>At 3 months</b>	Mean	2.95
	N	90
	SD	1.24
	Median	3
<b>At 6 months</b>	Mean	2.92
	N	90
	SD	1.73
	Median	3

## DISCUSSION

As per North American Spine Society (NASS) 2013 opinion- "TFESI is recommended to provide relief of radicular pain. TFESI has been found to be effective in providing pain relief for at least one month in more than fifty percent of patients, with half of these patients continuing to benefit from treatment for a year or more." In our study also 34 patients (68 percent) had significant immediate relief. This effect persisted in 27 patients till the follow up period of 12 months.

Cooper et al evaluating the effectiveness of LTFESI in 52 nonconsecutive patients with degenerative lumbar scoliotic stenosis and radiculopathy.<sup>4</sup> Patients received, on average, 1.3 injections of 80 mg triamcinolone with 1.5 cc of 2% lidocaine and were followed for 85.5 weeks. Outcomes were measured by numeric rating scale, NASS Patient satisfaction index and adapted Stucki outcome questionnaire pain and function scores. Successful outcome was defined as a patient satisfaction index of one or two, greater than two-point improvement on the NRS along with the summary pain and function scores. Success noted in 59.6% at one week, 55.8% at one month, 44.2% at three months, 37.2% at one year and 27.3% at two years.

Riew et al performed a prospective RCT to determine the effectiveness of selective nerve root injections.<sup>5</sup> Of the 55 consecutive patients, 27 were randomly assigned to receive bupivacaine alone and 28 received bupivacaine

with betamethasone. At mean follow-up of 23 months (13-28 months). The difference in operative rates between the two groups was significant with 67% of local anesthetic patients undergoing surgery compared to only 29% of corticosteroid plus anesthetic patients ( $p < 0.004$ ). Among patients with foraminal stenosis who avoided surgery, there was a significant decrease in neurological symptoms and low back pain on final evaluation. HIVD patients who avoided surgery showed a trend toward decreased back pain.

Ng et al conducted a prospective RCT.<sup>6</sup> Of the 86 consecutively assigned patients included in the study, 43 were randomly assigned to receive TFESI (bupivacaine+corticosteroid) and 43 received injections of bupivacaine alone. Outcomes were assessed at three months using the VAS and ODI along with patient satisfaction and change in walking distance. Intent to treat analysis did not demonstrate a statistically significant difference in Oswestry scores between the two treatment groups. In critique, this was a small study which was insufficiently powered to be an equivalence study.

Bogduk et al performed a prospective randomized controlled trial (RCT) assessing the efficacy of lumbar transforaminal epidural steroid injection (LTFESI) for radicular pain secondary to disc herniation.<sup>7</sup> Of the 150 consecutively assigned patients included in the study, 28 received LTFESI with triamcinolone. Outcomes were assessed at one month and one year via the Visual Analog Scale (VAS), SF-36 (version 1), Roland Morris disability

questionnaire (RMDQ) and the patient-specified functional outcome instrument. Additionally, work status and other health care services being utilized were assessed. The authors found that a significantly greater proportion of patients treated with transforaminal injection of steroid (54%) achieved pain relief compared to patients treated with transforaminal injection of local anesthetic (7%), transforaminal injection of saline (19%), intramuscular steroids (21%) or intramuscular saline (13%). Pain relief was corroborated by significant improvements in function and disability and reductions in use of other health care services. Outcomes were equivalent for patients with acute or chronic radicular pain. Over time, the number of patients who maintained relief diminished. Only some maintained relief beyond 12 months. In our study also we found relief diminishes over period of time.

Thomas et al performed a prospective RCT to determine the first-line injection procedure to recommend for treatment of lumbar radiculopathy secondary to a disc herniation.<sup>8</sup> Of the 31 consecutively assigned patients included in the study, 15 were treated with LTFESI and 16 received blind ILESI. Patients were assessed at six months with the VAS, RMDQ and Dallas pain questionnaire. Compared to the ILESI group the LTFESI patients had statistically significantly greater improvement in VAS at 30 days and six months, and daily activities, work and leisure activities, anxiety and depression and RMDQ scores at six months. The authors concluded that the efficacy of LTFESI is greater than ILESI for the relief of lumbar radicular pain at 30 days and six months.

## CONCLUSION

From our study we conclude that ESI are safe without any major adverse effects. Patients with radicular pain from disc herniation or lumbar canal stenosis obtain significant relief from a preganglionic TFESI irrespective of age, gender, level of injection, symptom, duration and pain intensity. Transforaminal epidural steroid therapy has better outcome with respect to Roland Morris disability assessment, Visual numeric scale, Oswestry disability index. In patients with TFESI, disability improves significantly. Maximum improvement occurs within 4 days. In majority of the patients response lasts for 6 months. Lumbar transforaminal epidural steroid injections (LTFESI) are cost effective. Transforaminal epidural steroid treatment better medication for pain

relief, patient satisfaction, disability improvement and functional improvement.

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