

Assessment of the Effectiveness of Transforaminal Epidural Injection with Trigger Point Injection in the Treatment of Low Back Pain: A Comparative Study

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Abstract:

Background: Chronic low back pain (CLBP) is a prevalent clinical condition with multifactorial etiology, often involving both radiculopathy and myofascial trigger points. While Transforaminal Epidural Steroid Injection (TFESI) is an established intervention for radicular pain, it may be insufficient when myofascial components are concurrently present. This study evaluates whether combining TFESI with Trigger Point Injection (TPI) offers superior pain relief and functional outcomes compared to TFESI alone.

Objectives: To assess and compare the effectiveness of TFESI alone versus TFESI combined with TPI in reducing pain intensity, improving functional status, prolonging analgesic duration, and reducing analgesic requirement in patients with chronic low back pain.

Methods: This was a prospective, comparative study conducted from January 2018 to December 2018 at Department of Anesthesia, Government Medical College, Bettiah, Bihar, India. A total of 120 patients with chronic low back pain were randomly divided into two groups: Group A received TFESI alone, while Group B received TFESI combined with TPI. Pain severity was measured using the Visual Analogue Scale (VAS), and functional impairment was assessed using the Oswestry Disability Index (ODI). Assessments were done at baseline, 1 week, 1 month, and 3 months post-procedure. Duration of analgesia, rescue analgesic requirement, adverse effects, and patient satisfaction were also recorded.

Results: Both groups showed significant improvement in VAS and ODI scores post-intervention. However, Group B (TFESI + TPI) demonstrated significantly better pain relief and functional outcomes at all follow-up intervals ($p < 0.001$). The duration of analgesia was significantly longer in Group B (8.7 ± 2.2 weeks) than in Group A (4.1 ± 1.4 weeks), and fewer patients in Group B required rescue analgesics. Patient satisfaction was higher in the combination group, and no major complications were reported.

Conclusion: The combination of TFESI with TPI provides enhanced and prolonged analgesia, superior functional improvement, and greater patient satisfaction compared to TFESI alone in managing chronic low back pain. This combined approach is safe, effective, and should be considered in routine clinical practice for patients with both radicular and myofascial components of pain.

Keywords: Chronic Low Back Pain, Transforaminal Epidural Steroid Injection, Trigger Point Injection, Radiculopathy, Myofascial Pain Syndrome, VAS, ODI, Pain Management.

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Introduction

Low back pain (LBP) remains one of the most common and debilitating musculoskeletal disorders worldwide, with substantial economic, social, and healthcare implications. It is estimated that over 80% of individuals will experience LBP at some point in their lives, and for a significant proportion, the condition becomes chronic, leading to functional impairment and reduced quality of life. Chronic low back pain (CLBP) is a multifactorial syndrome with a wide range of etiologies including discogenic, radicular, facet joint, sacroiliac, and myofascial pain [1,2].

Among these, lumbar radiculopathy caused by nerve root irritation or compression—often due to intervertebral disc herniation—is a leading cause of LBP. Transforaminal epidural steroid injection (TFESI) has emerged as a targeted and effective interventional modality for radicular pain, delivering corticosteroids and local anesthetics directly to the affected nerve root via the neural foramen [3]. This approach has shown good outcomes in terms of short- to intermediate-term pain relief and functional improvement.

However, many patients with chronic LBP exhibit concurrent myofascial pain syndrome (MPS), characterized by taut bands of skeletal muscle and trigger points that produce referred pain [4]. Trigger point injections (TPI) using local anesthetics and/or corticosteroids are widely employed for MPS management, offering muscle relaxation and improved mobility. Despite this, myofascial elements are often under-recognized in chronic LBP patients receiving TFESI alone, potentially contributing to incomplete or suboptimal relief [5].

Growing clinical evidence suggests that addressing both radicular and myofascial pain simultaneously may provide more comprehensive symptom control and improve patient outcomes [6]. Combining TFESI with TPI theoretically targets both nociceptive sources—neural and muscular—thereby enhancing analgesia, prolonging the pain-free interval, and reducing the need for repeat interventions or systemic medications [7].

This prospective comparative study was therefore undertaken to evaluate and compare the efficacy of TFESI alone versus a combined approach using TFESI with TPI in patients with chronic low back pain. Key outcome measures included pain intensity (VAS), functional disability (ODI), duration of analgesia, need for rescue analgesics, and patient satisfaction. By analyzing these parameters, the study aimed to assess whether the addition of TPI could enhance the clinical utility of TFESI and offer a more holistic interventional solution for chronic low back pain.

Methods

This prospective, comparative study was conducted in the Department of Anesthesia at Government Medical College, Bettiah, Bihar, India from January 2018 to December 2018. The study aimed to evaluate the clinical efficacy of transforaminal epidural steroid injection (TFESI) alone versus TFESI combined with trigger point injection (TPI) in patients suffering from chronic low back pain with a suspected component of radiculopathy and myofascial trigger point involvement.

A total of 120 adult patients aged between 25 and 65 years, presenting with chronic low back pain of more than 12 weeks' duration and radiological evidence of lumbar disc herniation with nerve root compression, were enrolled. Inclusion criteria included clinical symptoms of radiculopathy, positive straight leg raising test, and identification of myofascial trigger points on physical examination. Patients with previous lumbar surgery, systemic infections, coagulopathy, local site infection, allergy to study drugs, or severe psychiatric illness were excluded.

After obtaining ethical clearance and written informed consent, eligible participants were

randomly assigned using a computer-generated random number table into two groups of 60 each. Group A received TFESI alone, while Group B received TFESI combined with TPI at identified trigger points.

The TFESI procedure was performed under strict aseptic precautions in the prone position using fluoroscopic guidance. A 22-gauge spinal needle was advanced through the superior aspect of the intervertebral foramen adjacent to the affected nerve root. After negative aspiration for blood or cerebrospinal fluid, a combination of 2 mL of 0.25% bupivacaine with 40 mg of methylprednisolone acetate was injected.

For patients in Group B, following the TFESI procedure, trigger point injections were administered in the same sitting. Trigger points were identified via palpation for taut bands and tender nodules in paraspinal and gluteal muscles. A 25-gauge needle was used to inject 1–2 mL of 1% lidocaine without adrenaline into each identified point using the "spray and stretch" technique.

All patients were monitored for 30 minutes post-procedure and discharged the same day with instructions. Follow-up assessments were conducted at 1 week, 1 month, and 3 months post-injection. Pain intensity was measured using the Visual Analogue Scale (VAS), and functional disability was assessed with the Oswestry Disability Index (ODI). Duration of analgesia was defined as the time from injection to recurrence of moderate or severe pain requiring rescue analgesia. Patients were instructed to maintain a pain diary and were prescribed paracetamol (up to 3 g/day) as needed.

The requirement for rescue analgesics, adverse events, and patient satisfaction (rated on a 4-point Likert scale) were documented during follow-up. Data were analyzed using SPSS software version 25.0. Continuous variables were expressed as mean $\pm$ standard deviation and compared using the student's *t*-test. Categorical variables were compared using the chi-square test or Fisher's exact test as appropriate. A *p*-value < 0.05 was considered statistically significant.

Results

A total of 120 patients were enrolled and completed the study, with 60 in each group. Demographic and baseline clinical parameters were comparable between the groups. Over the 3-month follow-up, both groups showed significant improvement in pain and functional scores. However, Group B (TFESI + TPI) consistently demonstrated superior outcomes across all domains including faster onset of pain relief, longer duration of analgesia, reduced need for rescue analgesics, and higher patient satisfaction, without an increase in complications.

Table 1: Demographic Profile of Patients

Parameter	Group A (TFESI)	Group B (TFESI + TPI)	p-value
Number of Patients	60	60	—
Mean Age (years)	46.8 ± 10.2	45.7 ± 9.8	0.52
Male: Female Ratio	34:26	38:22	0.47

Table 2: Baseline Pain Scores (VAS) in Both Groups

Parameter	Group A (TFESI)	Group B (TFESI + TPI)	p-value
Mean VAS Score	7.6 ± 0.9	7.4 ± 1.0	0.28

Table 3: VAS Score at 1 Week Post-Injection

Parameter	Group A	Group B	p-value
Mean VAS Score	4.2 ± 1.0	3.1 ± 0.9	<0.001

Table 4: VAS Score at 1 Month Post-Injection

Parameter	Group A	Group B	p-value
Mean VAS Score	3.8 ± 1.1	2.5 ± 0.8	<0.001

Table 5: VAS Score at 3 Months Post-Injection

Parameter	Group A	Group B	p-value
Mean VAS Score	4.1 ± 1.3	2.7 ± 1.0	<0.001

Table 6: Oswestry Disability Index (ODI) Scores Over Time

Time Point	Group A ODI (%)	Group B ODI (%)	p-value
Baseline	58.6 ± 8.5	57.2 ± 9.1	0.42
1 Week	41.2 ± 7.6	31.5 ± 6.9	<0.001
1 Month	36.8 ± 6.5	25.6 ± 6.2	<0.001
3 Months	38.1 ± 7.2	26.9 ± 6.0	<0.001

Table 7: Duration of Analgesia (Weeks)

Parameter	Group A	Group B	p-value
Mean Duration	4.1 ± 1.4	8.7 ± 2.2	<0.001

Table 8: Rescue Analgesic Requirement (Number of Doses Over 3 Months)

Parameter	Group A	Group B	p-value
Mean Doses	10.3 ± 2.1	4.7 ± 1.6	<0.001

Table 9: Time to Onset of Pain Relief (in Hours)

Parameter	Group A	Group B	p-value
Mean Time	12.6 ± 3.4	6.3 ± 2.5	<0.001

Table 10: Patient Satisfaction (4-Point Likert Scale)

Satisfaction Level	Group A (n)	Group B (n)
Very Satisfied (Score 4)	18	35
Satisfied (Score 3)	25	20
Neutral (Score 2)	12	4
Dissatisfied (Score 1)	5	1
Mean Score ± SD	2.9 ± 0.8	3.5 ± 0.6
p-value	<0.001	

Discussion

Chronic low back pain remains a significant global health concern, often resulting in functional disability, reduced quality of life, and economic burden. While transforaminal epidural steroid injection (TFESI) is a commonly used intervention

for lumbosacral radiculopathy, the addition of myofascial trigger point injection (TPI) may provide enhanced pain relief in patients with overlapping myofascial components [8]. The present study was designed to evaluate the comparative efficacy of TFESI alone versus TFESI combined with TPI, and the findings clearly demonstrated superior outcomes

in the combination group across multiple clinical parameters.

Both treatment groups showed statistically significant improvements in pain (as measured by VAS) and functional disability (as measured by ODI) over the 3-month follow-up period [9]. However, Group B (TFESI + TPI) demonstrated more rapid onset of pain relief, greater magnitude of improvement, and longer duration of analgesia. These observations support the hypothesis that myofascial trigger points act as an additional pain generator in many patients with lumbar radiculopathy and addressing them simultaneously enhances treatment efficacy [10].

In particular, the VAS score reduction in Group B was significantly greater at all follow-up points (1 week, 1 month, and 3 months), with an earlier onset of pain relief (mean 6.3 hours in Group B vs. 12.6 hours in Group A), indicating that TPI accelerates analgesic onset [11]. Moreover, the duration of analgesia was nearly twice as long in Group B, suggesting that addressing both radicular and myofascial pain sources can prolong the pain-free interval. This aligns with previous research that has identified muscle-based nociception as a prominent contributor in chronic back pain syndromes [12].

The Oswestry Disability Index also improved more significantly in the combination group, underscoring better functional recovery and improved daily living. Reduced reliance on rescue analgesics in Group B further substantiates the enhanced efficacy and durability of combined therapy [13]. The mean number of rescue doses over 3 months in Group B was less than half that in Group A, reflecting a reduced pain burden and possibly greater patient compliance and satisfaction.

Patient satisfaction was notably higher in Group B, with 58.3% of patients rating their experience as "very satisfied" compared to only 30% in Group A. This difference emphasizes the clinical value patients place on rapid and sustained pain relief [14]. Importantly, no serious complications were observed in either group, and minor side effects such as transient headache or site pain were minimal and self-limiting. This underscores the safety profile of both interventions when performed under appropriate aseptic and imaging-guided conditions.

While the findings are encouraging, some limitations must be acknowledged [15]. The study had a 3-month follow-up period, which may not fully capture long-term recurrence rates. Moreover, the use of fluoroscopy was limited to TFESI and not used for TPI, which could introduce variability in injection accuracy. Future studies with larger cohorts and extended follow-up durations are recommended to validate these findings and explore the optimal frequency and dosing strategies for combined interventions.

In conclusion, this study highlights the enhanced effectiveness of combining TFESI with trigger point injection in patients with chronic low back pain. The dual approach offers faster onset, longer duration of pain relief, improved functional outcomes, and higher patient satisfaction without compromising safety. The findings advocate for a multimodal, targeted approach to managing chronic lumbosacral pain, particularly in patients with concurrent radicular and myofascial features.

Conclusion

The present comparative study demonstrates that the combination of transforaminal epidural steroid injection (TFESI) with trigger point injection (TPI) is significantly more effective than TFESI alone in the management of chronic low back pain, especially in patients exhibiting both radicular and myofascial components. Patients who received the combined therapy experienced faster onset of pain relief, longer duration of analgesia, greater reduction in pain scores (VAS), improved functional status (ODI), lower reliance on rescue analgesics, and higher overall satisfaction.

Importantly, the enhanced clinical outcomes achieved with the combined approach were not associated with increased adverse effects, affirming the safety and tolerability of this multimodal technique. These findings support the integration of trigger point management into standard epidural steroid protocols for a more holistic and effective strategy in treating chronic lumbosacral pain syndromes.

Therefore, transforaminal epidural injection augmented with trigger point injection should be considered a superior and safe alternative for patients with low back pain exhibiting mixed nociceptive mechanisms. Further research with larger sample sizes and longer follow-up durations is recommended to strengthen the evidence base and define optimal treatment algorithms.

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