



Decrease in pain one month after transforaminal lumbar steroid injection in patients with lumbosacral radiculopathy

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Abstract: Background: The objective of this study was to determine mean decrease in pain score one month after transforaminal lumbar steroid injection in patients with lumbosacral radiculopathy. **Methods:** A total of 95 cases presenting to orthopedics spin centre doctor hospital Lahore fulfilling the inclusion criteria were included in the study. An informed consent of the patients was obtained. Initial pain score on VAS was recorded. The nerve root to be infiltrated was determined. Methylprednisolone acetate (Depomedrol 0.5 ml/20 mg) and preservative free 0.5% bupivacaine (1.5 ml/7.5 mg) was injected together in a single syringe per nerve root. All the patients were followed-up for a period of 1 month. All patients were given Ibuprofen for first 3 post-procedure days to alleviate procedural pain. Subsequent to the procedure, all patients were directed to consult the researcher for back-strengthening exercises, starting after day-7 of the procedure. Mean pain score on 1 month follow up was recorded. **Result:** Mean pain score of the patients was recorded as 8.11 ± 0.82 , after treatment it was 5.2 ± 1.09 while mean decrease was recorded as 2.92 ± 0.69 , p value was calculated as 0.0001 showing a significant difference. **Conclusion:** We concluded that mean decrease in pain score one month after transforaminal lumbar steroid injection in patients with lumbosacral radiculopathy was significantly reduced when compared to initial pain score.

[Ali S, Saleem MJ, Ahmed N, Chaudhary M, Cheema NA, Durrani AA, Hafeez MM and Malik A. **Decrease in pain one month after transforaminal lumbar steroid injection in patients with lumbosacral radiculopathy.** *Life Sci J* 2020;17(4):6-10]. ISSN: 1097-8135 (Print) / ISSN: 2372-613X (Online). <http://www.lifesciencesite.com>. doi: [10.7537/marslsj170420.02](https://doi.org/10.7537/marslsj170420.02).

Keywords: Lumbosacral radiculopathy, reduction, pain, transforaminal lumbar epidural steroid injection (TLESI)

Introduction

Lumbar radiculopathy is a frequently reoccurring disease with significant socioeconomic repercussions [1]. The incidence of lumbar radiculopathy is around 2%. Out of 12.9% incidence of low back complaints within working population, 11% is due to lumbar radiculopathy [2]. Lumbar radicular pain can be caused by foraminal stenosis and space-occupying lesions in the lumbar spine, but the most common cause is lumbar disc herniation. Laboratory evidence implicates inflammation of the affected nerve roots in the mechanism of pain [3]. There are other causes of radiculopathy besides nerve root compression. Motor radiculopathy can be seen in patients from varicella zoster virus, even in the absence of skin lesions [4]. Inflammatory mediator cytokines, perhaps from regional disk disease or other factors, can be a source of neuropathic pain and a “chemical radiculitis” without evidence of nerve root compression [5]. Among the multiple interventions

used in managing chronic spinal pain, lumbar epidural injections have been used extensively to treat lumbar radicular pain. Among caudal, interlaminar, and transforaminal, transforaminal epidural injections have gained rapid and widespread acceptance for the treatment of lumbar and lower extremity pain. The potential advantages of transforaminal over interlaminar and caudal, include targeted delivery of a steroid to the site of pathology, presumably onto an inflamed nerve root [6]. However, there are only a few well-designed, randomized, controlled studies on the effectiveness of steroid injections. Consequently, multiple systematic reviews with diverse opinions have been published. Previously a study the efficacy and safety of the transforaminal lumbar epidural steroid injection (TLESI) applied to patients with radiculopathy where the initial mean VAS score average was 8.2 ± 0.7 , after TLESI, it was 5.0 ± 1.6 at

one month follow up and mean decrease in pain was 3.2 ± 0.9 [7]. Another study evaluated the efficacy of TLESI in patients with lumbosacral radiculopathy and recorded mean VAS score as 9.2 ± 1.1 at initial level and 3.9 ± 1.3 at 1 month follow up, mean decrease in pain was 5.3 ± 1.3 [8]. The rationale of the study is that the above two studies are showing significant difference in mean decrease in pain score on VAS at 1 months follow up in patients with lumbosacral radiculopathy treated with TLESI, which creates the need to clarify this significant difference. Another reason to conduct this study is that in our population, the TLESI is not evaluated. The results of this study will be helpful to generate a primary data in our targeted population which will make consensus while managing lumbosacral radiculopathy.

Material and method

It is an experimental follow up Study. Current study is carried out after the approval of ethical committee of Jinnah hospital Lahore at Orthopedics, Unit, Allama Iqbal Medical College, Jinnah Hospital, Lahore. Sample size of 80 cases, calculated with 95% confidence level.

Inclusion Criteria

- Age: 30-70 years
- Gender: Male/Female
- All diagnosed cases of lumbosacral radioculopathy

Exclusion Criteria

- All patients with motor deficit
- Previous back surgery
- History of substance abuse
- Signs of infection (e.g. pain, raised TLC count ($>11,000$) and CRP (>6) and fever)
- Coagulopathy (on PTINR, BT/CT)
- History of transforaminal lumbar steroid injection
 - Extruded or migrated disc
 - Spondylolisthesis or severe spinal deformity and inability to comply with the measures of outcome analysis

Data collection procedure

A total of 95 cases presenting to Out Patient Department of Jinnah Hospital Lahore fulfilling the inclusion criteria were included in the study. History was taken and physical examination of the patients was done. Demographic information was collected on a pre-designed proforma. An informed consent of the patients was obtained. Initial pain score on VAS was recorded. All the injections were performed by the researcher himself under the supervision of senior consultant. The nerve root to be infiltrated was determined. Typically S1 nerve root was located in S1

dorsal foramen, L5 nerve root in L5- S1 intervertebral foramina, L4 in L4-L5 foramina and so on. Transforaminal lumbar steroid injection was delivered through the 'safe triangle' which comprises of a roof made by the pedicle of vertebra, a tangential base corresponding to the exiting nerve root and the lateral border of the vertebral body. Next step was to give 10-20 degree oblique tilt to place the needle under the pedicle using the tunnel view. Lateral X-ray confirmed the position of the needle at the ventral aspect of the foramen. At each level 1-2 ml of contrast medium iohexol (omnipaque 300) was injected to outline the nerve root. Epidural spread was also expected with 2 ml of contrast. Drug was never injected in case of any doubt regarding the pattern of spread of the contrast. Methylprednisolone acetate (Depomedrol 0.5 ml/20 mg) and preservative free 0.5% bupivacaine (1.5 ml/7.5 mg) was injected together in a single syringe per nerve root. All the patients were followed-up for a period of 1 month. All patients were given Ibuprofen for first 3 post-procedure days to alleviate procedural pain. Subsequent to the procedure, all patients were directed to consult the researcher for back-strengthening exercises, starting after day-7 of the procedure. Mean pain score on 1 month follow up was recorded. All this information was recorded on a pre-designed proforma. Decrease in pain score was recorded.

Data analysis procedure

All the collected data was entered & analyzed by SPSS version 16. Quantitative variable like age and mean pain score before and after the injection was presented by mean and SD. Frequency and percentage of variables like gender were calculated and presented in tabulated form. Effect modifiers are already controlled through exclusion criteria. Data was stratified for age & gender, baseline pain score. T-test was applied post-stratification with P-Value < 0.05 considered as significant.

Results

A total of 95 cases fulfilling the inclusion/exclusion criteria were enrolled to determine mean decrease in pain score one month after transforaminal lumbar steroid injection in patients with lumbosacral radiculopathy. The age of the patients was recorded, it shows that 56.84% (n=54) were between 30-50 years of age while 43.16% (n=41) were between 51-70 years of age, mean \pm SD was calculated as 49.19 ± 4.38 years. Patients were distributed according to gender, it shows that 64.21% (n=61) were male and 35.79% (n=34) were females (Table 1).

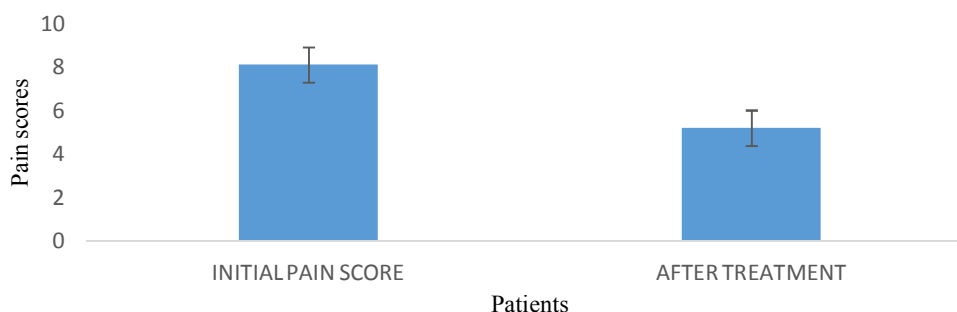
Table 1. Age & Gender Distribution (n=95)

Variable		No. Of Patients	Percentage
Age	30-50	54	56.84%
	51-70	41	43.16%
Gender	Male	61	64.21%
	female	34	35.79%

Mean pain score of the patients was recorded as 8.11 ± 0.82 , after treatment it was 5.2 ± 1.09 while mean decrease was recorded as 2.92 ± 0.69 , p value was calculated as 0.0001 showing a significant difference (Table 2 & Figure1).

Table 2. Mean pain score of the patients (n=95)

Variables	Mean	SD	P value
Initial Pain Score	8.11	0.82	0.0001
After Treatment	5.2	1.09	
Mean Decrease	2.92	0.69	

**Figure 1. Mean pain score of the patients**

When the data is stratified in different age groups and gender results showed current therapy is equally effective in all age groups. Male and female are also

equally benefited by this technique. Table 3 shows the effectiveness of TLESI in all age groups irrespective of gender.

Table 3. Stratification for age & gender (n=95)

Variables		Initial Pain Score (Mean)	After Pain Score (Mean)	Mean Decrease	P Value
Age	30-50	8.17 ± 0.79	5.33 ± 0.95	2.83 ± 0.69	0.0001
	51-70	8.04 ± 0.86	5.02 ± 1.25	3.02 ± 0.69	
Gender	Male	8.14 ± 0.85	5.19 ± 1.04	2.95 ± 0.64	0.0001
	Female	8.05 ± 0.77	5.21 ± 1.20	2.85 ± 0.78	

Discussion

For the treatment of lumbar radicular pain, conservative therapy (analgesics, physical therapy and traction) has been shown to be no more effective than natural history. Lumbar radicular pain (otherwise and previously known as sciatica) can be caused by foraminal stenosis and space-occupying lesions in the lumbar spine, but the most common cause is lumbar disc herniation. Injections of steroids, by various routes, have been used as an alternative to surgery, and

as an alternative or complement to conservative therapy, for the treatment of lumbar radicular pain. This study was planned with the view that previous studies were showing significant difference in mean decrease in pain score on VAS at 1 months follow up in patients with lumbosacral radiculopathy treated with TFESI while it was not evaluated in our population. In our study, out of 95 cases, 56.84% (n=54) were between 30-50 years of age while 43.16% (n=41) were between 51-70 years of age, mean \pm SD

was calculated as 49.19 ± 4.38 years, 64.21% (n=61) were male and 35.79% (n=34) were females, mean pain score of the patients was recorded as 8.11 ± 0.82 , after treatment it was 5.2 ± 1.09 while mean decrease was recorded as 2.92 ± 0.69 , p value was calculated as 0.0001 showing a significant difference. Previously a study the efficacy and safety of the transforaminal lumbar epidural steroid injection (TLESI) applied to patients with radiculopathy where the initial mean VAS score average was 8.2 ± 0.7 , after TLESI, it was 5.0 ± 1.6 at one month follow up and mean decrease in pain was 3.2 ± 0.9 , these findings are in agreement with our study, while another study evaluated the efficacy of TLESI in patients with lumbosacral radiculopathy and recorded mean VAS score as 9.2 ± 1.1 at initial level and 3.9 ± 1.3 at 1 month follow up, mean decrease in pain was 5.3 ± 1.3 [7, 8]. Our findings are in agreement with this study also regarding mean decrease in pain score at 1 month follow up of TLESI. Ali Ghahreman and others revealed that a significantly greater proportion of patients treated with transforaminal injection of steroid (54%) achieved relief of pain than did patients treated with transforaminal injection of local anesthetic (7%) or transforaminal injection of saline (19%), intramuscular steroids (21%), or intramuscular saline (13%). Relief of pain was corroborated by significant improvements in function and disability, and reductions in use of other health care. 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. The proportions of patients doing so were not significantly different statistically between groups. They concluded that Transforaminal injection of steroids is effective only in a proportion of patients. Its superiority over other injections is obscured when group data are compared but emerges when categorical outcomes are calculated. Over time, the proportion of patients with maintained responses diminishes [9]. Schaufele et al and Riew *et al* noted that transforaminal ESI decreases the need for discectomies for lumbar disc herniation [10]. This was also noted in their study where the surgery rate was 6.1%. This rate is lower than the rate, previously reported on (10% - 29%) [11]. Based on the recent concepts of pain generation in the sciatic condition, it's believed that concomitant chemical irritation of the nerve root that's caused by disk material is the decisive factor for the development of severe sciatica, rather than the pain being due to mechanical compression alone [12-16]. According to this concept, the local application of corticosteroids in the area of the compressed, inflamed nerve root appears to be a reasonable treatment option. Thus, percutaneous injection based therapies, including TFESI, are being

used with increasing frequency to treat the radiculopathy resulting from a herniated disc or degenerative lumbar spinal stenosis. The results of this study are helpful to generate a primary data in our targeted population which makes consensus while managing lumbosacral radiculopathy.

Conclusion

We concluded that mean decrease in pain score one month after transforaminal lumbar steroid injection in patients with lumbosacral radiculopathy was significantly reduced when compared to initial pain score.

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3/17/2020