



ROLE OF SELECTIVE NERVE ROOT BLOCK THROUGH TRANSFORAMINAL APPROACH IN CASES OF LUMBER PIVD

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ABSTRACT

Introduction: Lumbar radiculopathy due to a prolapsed disc is defined as a clinical syndrome of back and leg pain accompanied by sensory, reflex, or motor deficits in a nerve root distribution. Both surgical and non-surgical treatments are available. This prospective analytic study was designed to assess the efficacy of selective nerve root block with corticosteroids through transforaminal approach in the management of pain associated with prolapsed lumbar intervertebral disc that didn't get relief from non-surgical pharmacological treatment. **Materials and Methods:** This prospective study was conducted to evaluate the effectiveness of selective nerve root block injections through transforaminal approach in 64 cases of prolapsed intervertebral disc (PIVD). After selective nerve root block all patients were re-evaluated at 1, 3 and 6 months, using the visual analogue scale (VAS) pain score for assessment of pain and Oswestry Disability Scale (ODI) was employed to quantitate the level of function. **Results:** In this study, the Oswestry Disability Index (Mean ODI) was high during pre-injection 72.20 ± 5.28 (range 9-79) and decreased to 25.90 ± 2.76 (range 1-37) after 6 months. Similarly, the visual analog scale (Mean VAS) pain score was highest on the pre-injection time point 7.80 ± 1.20 (range 5-10) and decreased after the injection to reach 3.20 ± 1.14 (range 0-5) after 6 months. **Conclusion:** Selective nerve root block through transforaminal approach is a safe and effective treatment modality in cases of lumbar PIVD.

KEYWORDS

Lumbar PIVD, Root block, VAS, ODI

INTRODUCTION

Chronic lumbar radiculopathy is defined as a clinical syndrome of back and leg pain accompanied by sensory, reflex, or motor deficits in a nerve root distribution lasting for more than 12 weeks [1-3]. The lifetime prevalence of lumbar radiculopathy has been reported to be 5.3% in men and 3.7% in women [4]. Lumbar radiculopathy due to a prolapsed disc resolves spontaneously in 23-48% of patients, but up to 30% will still have pronounced symptoms after one year, 20% will be out of work, and 5-15% will undergo surgery [5, 6].

Considering that multiple pathophysiological mechanisms underlie lumbar radiculopathy, diverse modalities of treatment have been developed over the years [7]. Steroids have been demonstrated to have a therapeutic role, owing to their anti-inflammatory and nociceptive signal stabilizing properties [8-10]. Three principal techniques are available in order to deliver medication into the epidural space: caudal, transforaminal and inter-laminar routes. The trans-foraminal approach is advantageous because corticosteroid preparations can be closely injected to the probable source of the irritated nerve root, and this approach results in better ventral epidural spreading than the inter-laminar approach [11, 12].

This prospective study was designed to assess the efficacy of selective nerve root block with corticosteroids in the management of pain associated with prolapsed lumbar intervertebral disc that didn't get relief from non-surgical pharmacological treatment.

MATERIALS AND METHODS

A prospective follow-up study was carried out in the department of Orthopaedics, SDH Bijbahara from June 2020 to May 2022 with the purpose of determining the effectiveness of selective nerve root block injections through transforaminal approach in cases of prolapsed intervertebral disc (PIVD). In this study a total of 64 patients with low back pain, did not improve with non-invasive and non-surgical techniques. The inclusion criteria were both male and female patients of age >18 years, patients with a history of lower back pain and lower extremities discomfort lasting at least six weeks and not improving with conservative treatment, and an MRI confirming the diagnosis of PIVD. Patients having PIVD with neurological deficits, prior lumbar surgery, spinal stenosis, anomalies in the structure of the spine, any acute or chronic uncontrolled medical disease, patients with psychological disorders and patients who had a history of potential steroid side effects were excluded from the study. Detailed information about the type of the procedure and the possible side effects and complications was given to each patient and written informed consent was obtained.

Intervention

To perform the procedure, the individuals were positioned in ventral decubitus and the injection location was marked with the aid of a fluoroscope. After proper disinfection, the skin and subcutaneous tissue were infiltrated with 2 ml of 2% lidocaine. A 22G (0.70mm) X 3.1/2" rachianesthesia needle was introduced up to the intervertebral foramen, identified with the assistance of the radioscope, and then a non-ionic contrast agent was injected under continuous radioscope visualization to monitor the distribution of the contrast agent in the epidural space and to avoid an intravascular injection. Once the correct placement of the needle was confirmed, an infiltration of 2 ml of Methylprednisolone and 3 ml of 2% xylocaine was applied. After the procedure aseptic dressing was done and patient was monitored for next 2 hours and then sent home on the same day.

All the patients were instructed to continue conservative treatment with active physical therapy and exercises at home, in addition to using simple analgesics, as needed. All patients were re-evaluated after 1, 3 and 6 months, using the visual analogue scale (VAS) pain score for assessment of current back and lower extremity pain was used and was compared with initial values. Any decrement in the VAS pain scores of more than two scales was considered to be significant. An Oswestry Disability Scale (ODI) was employed to quantitate the level of function (on a 0 to 50-point scale, in which a higher score represented greater disability) and significant improvement and function was described as at least a 40% reduction in ODI.

RESULTS

The mean age of the study population was 47.7 (range 29-66) years. In this study, there were 41 (64 %) males and 23 (36 %) females. In this study the maximum 31 (48 %) patients were below the age of 40 years. The average duration of pain was 7.30 (range 1-19) months. The most common level of prolapsed disc was L4-L5 in 27 (42 %) patients followed by L3-L4 in 19 (30 %) patients, L5-S1 in 11 (17 %) patients, L2-L3 in 4 (6 %) patients and L1-L2 in 3 (5 %) patients (Table 1).

In this study, the Oswestry Disability Index (Mean ODI) was high during pre-injection 72.20 ± 5.28 (range 9-79) and decreased to 25.90 ± 2.76 (range 1-37) after 6 months. Similarly, the visual analog scale (Mean VAS) pain score was highest on the pre-injection time point 7.80 ± 1.20 (range 5-10) and decreased after the injection to reach 3.20 ± 1.14 (range 0-5) after 6 months (Table 2).

Table 1: Demographic Characters Of Enrolled Patients

Characters	No. of patients	Percentage
Gender		

Male	41	64
Female	23	36
Age group		
<40 Years	31	48
40-60 Years	24	38
>60 Years	9	14
Duration of pain		
<6 Weeks	7	11
6-12 Weeks	13	20
12-18 Weeks	18	28
18-24 Weeks	21	33
>24 Weeks	5	8
Herniated discs by level		
L1-L2	3	5
L2-L3	4	6
L3-L4	19	30
L4-L5	27	42
L5-S1	11	17

Table 2: Changes In Mean Oswestry Disability Index And Visual Analog Scale At Different Time Intervals

Time intervals	Oswestry disability index (ODI)		Visual Analog Scale (VAS)	
	Mean $\pm$ SD	Range	Mean $\pm$ SD	Range
Baseline	72.20 $\pm$ 5.28	9-79	7.80 $\pm$ 1.20	5-10
At 1-month	31.80 $\pm$ 6.10	1-40	3.10 $\pm$ 0.92	1-5
At 3-month	17.40 $\pm$ 3.42	1-31	2.80 $\pm$ 1.05	0-4
At 6-month	25.90 $\pm$ 2.76	1-37	3.20 $\pm$ 1.14	0-5

DISCUSSION

Herniated nucleus pulposus pain is a significant medical and socioeconomic issue. Pain and limited movement are major detriments to one's quality of life, especially for those who work. Analgesic use for extended periods of time is not recommended or advantageous. For LBP, lumbar tractions, different physiotherapy methods, and manipulations have all been employed, but with varying degrees of success. Surgery should only be considered in cases that are unrelenting or in which neurological condition is rapidly declining. Many LBP patients attend different orthopaedic departments feeling dissatisfied or unrelieved due to the limited array of treatment available.

Epidural steroid injections for lumbar radiculopathy have been used since 1953 [13]. Along with mechanical compression of nerve roots, lumbar radiculopathy can be triggered by different pro-inflammatory chemical agents causing ectopic neuron firing [14, 15]. Steroids injected into the epidural space or around the affected nerve root are thought to inhibit these inflammatory mediators. The patients included in this study were selected from among those with persistent symptoms despite conservative treatment and who already presented the criteria for a surgical indication. After the introduction of ATB as a routine treatment for symptomatic LDH, the rate of herniated disc surgeries dropped considerably as compared to the prior experience of other authors.

One can provide epidural steroid injections by caudal, interlaminar, or transforaminal methods. The use of ESI by transforaminal route was documented by Robecchi and Capra (1952) [16] and Lievre (1953) [17], whilst the administration of corticosteroids by caudal epidural space was recorded by Cappio [18] in 1957. We employed the transforaminal epidural method and obtained good outcomes. The transforaminal approach is most advantageous as medications are delivered close to the probable source of their rotated nerve root, requires least amount of medication, and this approach results in better ventral epidural spreading of drug than the inter laminar approach but requires a skilled interventionist besides the use of fluoroscopy or a CT scan.

Mehta N et al [19] did a randomized trial consisted of 120 patients treated with either TFESI or were managed conservatively with a history of persistent LBP with radiculopathy secondary to disc herniation or spinal canal stenosis and they observed that TFESI group showed statistically significant improvement in all parameters. At the end of 1 month, significant improvement was seen in 93% of patients in the ESI group and 23% of patients treated conservatively when all participants were included. In their study baseline VAS score was 8.20 $\pm$ 1.10 which reduced to 1.13 $\pm$ 0.35 at 1 month in TFESI group. In our study, we have observed that the initial mean VAS was 7.80 $\pm$ 1.20,

which reduced to 3.20 $\pm$ 1.14 at final follow-up of 6 months, with a significant reduction.

Our findings supported earlier research suggesting that the benefits of TFESI are temporary in terms of the patient's improved pain and functional status. Because of short time period, we were unable to comment on the long-term effects. Our descriptive study has some limitations, such as the cross-sectional design, which is less potent than a cohort study, less number of patients and short period of follow-up. In addition, the information has been gathered from a single center, so the results cannot be generalizable.

CONCLUSION

This study showed that transforaminal nerve blocks were found effective as a temporary alternative treatment with proven efficacy in quick pain relief. Most benefits are described in the immediate or early phase after the injection. Selective nerve root block through transforaminal approach is a safe and effective treatment modality PIVD.

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