

ORIGINAL RESEARCH

CLINICAL STUDY OF EPIDURAL METHYLPREDNISOLONE INJECTION IN TREATMENT OF PROLAPSED INTER-VERTEBRAL DISC (PIVD) CASES

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ABSTRACT

Background: A vast majority of prolapsed inter-vertebral disc (PIVD) occur at L4-L5 and L5-S1 level causing L5 and S1 radiculopathy. Lumbar epidural steroid injection (LESI) forms an important part of modern spine care, in cases not responding to conservative management for more than 3 months. Present study was aimed to study epidural methylprednisolone injection in treatment of prolapsed inter-vertebral disc (PIVD) cases.

Material and Methods: Present study was hospital based, prospective, observational study, conducted patients aged 18 to 65 years suffering from mechanical LBP with radiation due to PIVD at L4-L5 and L5-S1 (diagnosed with MRI) with symptom duration of less than 1 year, symptom severity of ≥ 6 cm VAS score for pain, and not responding to conservative management for 3 months, received epidural steroid injection of methylprednisolone (80 mg).

Results: In present study, out of 55 enrolled patients, 42 completed follow-up. Majority were females (54.76 %), left side affected (52.38 %), Housewife (42.86 %) & labourers (26.19 %). Mean age was 38.32 ± 9.18 years, mean BMI was 27.89 ± 4.12 kg/m², average duration of pain was 13.33 ± 4.16 weeks. L4-L5 (61.9 %) were commonly involved as compared to L5-S1 (38.1 %). As per MRI Grading, Grade 2 (66.67 %) were more than Grade 3 (33.33 %) cases. We noted a significant improvement in Oswestry Disability Index Score (ODI) and the Visual Analogue Scale (VAS) as compared to baseline & at 6-month follow-up values, difference was highly significant (< 0.001).

Conclusion: Epidural use of methyl prednisone is safe and efficacious treatment modality in management of low back pain and radicular pain due to a prolapsed lumbar intervertebral disc.

Keywords: Epidural, methyl prednisone, radicular pain, prolapsed lumbar intervertebral disc.

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INTRODUCTION

Irritation of a sensory root or dorsal root ganglia (DRG) of a spinal nerve caused by herniated nucleus pulposus generates impulse in distal axon which is perceived as radicular pain.¹ Herniated disc is the most frequent cause of radiculopathy. Some people with symptoms suggestive of radiculopathy may not show any disc prolapse in an MRI or CT scan, while others without symptoms may present disc prolapse.²

A vast majority of prolapsed inter-vertebral disc (PIVD) occur at L4-L5 and L5-S1 level causing L5 and S1 radiculopathy.³ non-surgical treatment of chronic low back pain covers a wide range of alternatives including conventional physiotherapy, manipulations and other manual methods of traction.⁴ Surgical treatment in the form of excision has its own disadvantages like persistence of back pain, infection, postoperative adhesions and mechanical instability.⁵

Lumbar epidural steroid injection (LESI) forms an important part of modern spine care. These can be performed by a transforaminal, interlaminar, or caudal approach by injecting either a steroid alone or with a local anesthetic agent.^{6,7} Although the exact mechanism of action is not clear, it is probably because of the local anti-inflammatory and membrane stabilizing effects of the steroid and independent modulation of the peripheral nociceptor input.⁷ Present study was aimed to study epidural methylprednisolone injection in treatment of prolapsed inter-vertebral disc (PIVD) cases.

MATERIAL AND METHODS

Present study was hospital based, prospective, observational study, conducted in department of orthopedics, at District Hospital, Udhampur, India. Study duration was of 1 year (January 2021 to December 2021) & 6 months follow up was completed. This study was approved by the hospital research committee.

Inclusion criteria

- Patients aged 18 to 65 years suffering from mechanical LBP with radiation due to PIVD at L4-L5 and L5-S1 (diagnosed with MRI) with symptom duration of less than 1 year, symptom severity of ≥ 6 cm VAS score for pain, and not responding to conservative management for 3 months, willing to participate in present study.

Exclusion criteria

- Patients suffering from concomitant painful conditions, such as lower limb joint pain or peripheral vascular diseases
- Patients with uncontrolled diabetes, bleeding disorders,
- local infection at injection site, evidence of underlying spinal infection
- spondylolisthesis at lumbo-sacral region
- Pregnant women, exclusive breast-feeding mothers, and patients who are allergic to local anesthetics, antibiotics or radiographic dye

Informed consent was obtained from each patient. All the patients underwent a thorough clinical evaluation in way of a history of the illness, including the details of pain, duration of the symptoms, as well as the nature of the conservative treatment they had received in the past. This was followed by a complete physical examination including neurological assessment of the lower limb. Radiological & laboratory investigations were noted for every patient (X-ray Lumbo-Sacral Spine – AP / LAT, MRI Lumbosacral Spine, Routine Hemogram, BT-CT, blood sugar level).

Oswestry Disability Index Score (ODIS) and the Visual Analogue Scale (VAS) were discussed with patients; the scores were evaluated before and after the intervention, and at every follow up. Procedure was explained to patients & written informed consent was taken before procedure.

Epidural steroid injection (ESI) was given in operation theatre. During the procedure, peripheral venous access was secured, patient monitor for monitoring ECG, heart rate, non-invasive blood pressure (NIBP), and pulse oximetry was attached. In prone position on two bolsters, cleaning and draping of the part was done under aseptic precaution. The sacral hiatus was located by surface anatomy. Using strict aseptic technique, 2% lidocaine was

infiltrated to the skin and subcutaneous tissue for surface anesthesia. An 18-gauge caudal epidural needle was used, injection methylprednisolone 2 ml (80 mg Depo-Medrol® by Pfizer) and 6 ml of 2% lignocaine was diluted in 10 ml of normal saline and injected into the caudal epidural space by transforaminal approach.

After the procedure, the patient was kept under observation for 30 minutes patient was checked for any motor or sensory block and then was shifted to ward. Patient was advised to lie in supine position for 24 hours and was given orally tablet cefuroxime 500mg twice daily along with tablet diclofenac 75mg for two days during the post-injection period. Patient was kept admitted in the hospital for the night and discharged next day.

The patients were first reviewed after post procedure day, and then further follow up was carried out at 3 weeks, 3 months and 6 months after the caudal epidural steroid injection. During follow up, the Oswestry disability index (ODI) and visual analog score (VAS) were used to evaluate the response of treatment. Patients of low back ache with radiculopathy not responding to even three doses of epidural steroids were considered for surgery.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

RESULTS

In present study, out of 55 enrolled patients, 42 completed follow-up. Majority were females (54.76 %), left side affected (52.38 %), Housewife (42.86 %) & labourers (26.19 %). Mean age was 38.32 ± 9.18 years, mean BMI was 27.89 ± 4.12 kg/m², average duration of pain was 13.33 ± 4.16 weeks. L4-L5 (61.9 %) were commonly involved as compared to L5-S1 (38.1 %). As per MRI Grading, Grade 2 (66.67 %) were more than Grade 3 (33.33 %) cases.

Table 1: General characteristic

Characteristics	No. of patients/ Mean \pm SD	Percentage
Gender		
Male	19	45.24%
Female	23	54.76%
Mean age (years)	38.32 ± 9.18	
BMI (kg/m ²)	27.89 ± 4.12	
Duration of pain (weeks)	13.33 ± 4.16	
Side affected		
Right	20	47.62%
Left	22	52.38%
Level		
L4-L5	26	61.90%
L5-S1	16	38.10%
Occupation		
Housewife	18	42.86%
Labourers	11	26.19%
Office workers	9	21.43%
Others	4	9.52%
Grading (MRI)		
Grade 2	28	66.67%
Grade 3	14	33.33%

In present study, we noted a significant improvement in Oswestry Disability Index Score (ODI) and the Visual Analogue Scale (VAS) as compared to baseline & at 6-month follow-up values, difference was highly significant (< 0.001)

Table 2:

Parameter	Oswestry Disability Index Score (ODI)	Visual Analogue Scale (VAS)
Baseline	67.56 ± 12.45	7.54 ± 1.95
1 week	41.63 ± 13.64	2.91 ± 1.05
1 month	21.73 ± 6.51	2.12 ± 0.91
6 months	14.98 ± 4.92	1.55 ± 0.72
p-value	< 0.001	< 0.001

DISCUSSION

Radiculopathy from lumbar disc herniation can be a result of mechanical compression, ischemia or inflammatory irritation of the nerve root. Steroids reduce inflammation⁸ by inhibiting proinflammatory mediators like phospholipase A2, histamine etc. and by the action of stabilizing hyper-excitable nerve membranes. In addition to being a less invasive procedure, epidural steroid injections have less morbidity and mortality compared to the surgical procedures.⁹

Commonly used corticosteroids include dexamethasone, betamethasone, methylprednisolone and triamcinolone. All corticosteroid preparations used for epidural injection are particulate except dexamethasone and betamethasone sodium phosphate.¹⁰ The rationale behind injecting glucocorticoid into the epidural space is that it combats the inflammatory response associated with disc herniation and reduces pain. Reports of the effectiveness of epidural corticosteroids have varied from 18% to 90%.¹¹

Digambar PN et al.,¹² studied 50 patients of either sex aged between 35-65 years presenting with features of cervical and lumbar radiculopathy pain, received single lumbar epidural injection of local anaesthetic, tramadol and methylprednisolone. Immediate and post procedural complications observed were nausea and vomiting (20%), painful injection site (4%), hypotension (10%) and high block (4%). Pain relief was assessed after the three injections by three grades: 37 (74%) had complete resolution of symptoms; 18% had partial relief and 8% did not benefit from the procedure.

In study by Chaudhary S, et al.,¹³ 41 patients of confirmed diagnosis of prolapse intervertebral disc (PIVD) received, Caudal epidural steroid injection (CESI) of 80 mg methylprednisolone acetate diluted in 20 ml of 0.9% saline. 37 patients completed the study. Significant improvement in patient's status was observed after CESI, as measured with MST, SLR, NRS and ODI at one- and three-weeks post injection and the improvement were maintained till 12th week. 83 % of patients were satisfied at the end of the study and side-effects reported were mild. CESI is a simple, safe and cost-effective intervention procedure for the treatment of chronic LBP due to PIVD. It provides rapid pain relief and improvement of physical function starting within a week of injection.

In study by Gul IA et al.,¹⁴ 80% patients got a significant improvement in symptoms according to VAS scoring system. Out of them, 70% improved with only a single dose of ESI, 20% with the second dose and the remaining 10% after third dose. Also, the procedure was found to be more effective in treating patients of subacute low backache with radiculopathy rather than the chronic one.

Jamadar et al.¹⁵ studied on the efficacy of epidural steroid in chronic LBP in 56 patients. They found the success rate of epidural steroid 83.92% with only 10.71% failure (6

patients out of 56 got no pain relief). They too concluded epidural steroid as an effective treatment in patients with chronic LBP for those patients who failed to respond to conservative treatment and should be the choice before surgery.

Pratyush S et al.,¹⁶ studied 67 patients that received TFESI. The mean age was 55.8 ± 14.39 years and 51.3% were females. 68.57% had L5 and 20% had S1 radiculopathy. Bony recess stenosis was seen in the aged 40%. The median duration of radicular pain prior to intervention was 3 months. TFESI was effective as the mean numeric pain scale before injection was 8.97 ± 1.32 which reduced to 3.91 ± 3.23 (p value < 0.001) at 1 week post injection and 3.23 ± 3.34 (p value < 0.001) at 3 months post injection. 26 of the 35 patients (75.29%) had more than 50% pain relief compared to baseline at 3 months and were satisfied. 9 patients continued to have pain; however, only 1 required a surgical intervention. The effectiveness of TFESI was not significantly different in different ages (Fisher's exact test p value 0.182) and in different anatomic levels (Fisher's exact test p value 0.241). 6 out of 8 patients with bony recess stenosis benefited as compared to 14 out of 19 patients with PIVD, though it was not statistically significant (Fischer's exact test p value 0.688). There were no adverse events recorded.

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.^{17,18}

The limitations of present study were no control group was used, small sample size & limited duration follow up, however, further studies on a larger population with a control group receiving placebo are recommended.

CONCLUSION

Epidural use of methyl prednisone is safe and efficacious treatment modality in management of low back pain and radicular pain due to a prolapsed lumbar intervertebral disc. Epidural use of methyl prednisone should be considered as a primary non-surgical treatment after failing traditional conservative measures at pain and rehabilitation clinics.

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