

Comparative Study of Transforaminal Versus Interlaminar Epidural Steroid Injection for Pain Management in Lumbar Prolapsed Intervertebral Disc

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Abstract

➤ *Background:*

The popularity of epidural steroid injections in lower back pain has increased in recent years, due to better understanding of effectiveness in reducing pain and improving daily life functioning.

➤ *Aim:*

To compare transforaminal versus interlaminar epidural steroid injection for pain management in lumbar intervertebral disc prolapsed cases.

➤ *Method:*

A total number of 60 patients (ASA class 1 and II) were selected randomly in two groups, thirty in each group. Group A (n=30) interlaminar group: Patients will receive inj. 2% xylocaine (4ml) +methyl prednisolone 80 mg (2ml) Group B (n=30) transforaminal group: patients will receive inj.2%xylocaine (1ml) +methyl prednisolone 40 mg (1ml) The parameters including pulse rate, non invasive systolic and diastolic blood pressure, SpO₂, Primary objective To see improvement in Japanese orthopaedic association (JOA) score from baseline to 1 and at 6 month Secondary objective- To see the side effects, if any

➤ *Result:*

The Japanese orthopaedic association scoring and rate of improvement after injection at 1,3 and 6 months of injection follow up were found effective by transforaminal route than interlaminar results were statistically significant between both the groups (p<0.05).

No significant side effects were seen in both the groups.

➤ *Conclusion:*

The management of low back pain due to prolapsed lumbar intervertebral disc by injecting methyl prednisone in epidural space is satisfactory in current study. Both the techniques are effective but transforaminal route is more effective.

Keywords:- Epidural, Low Back Pain, Prolapsed Intervertebral Disc.

I. INTRODUCTION

Pain, as defined by the International Association for the Study of Pain (IASP) is —an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage^[1]. Pain is frequently the result of nociception, an activity in the nervous system that results from the stimulation of nociceptors. This activity is carried to the brain, usually via the spinal cord, conveys information, without conscious awareness, about damage or near-damage in body tissues^[2]. Low Back Pain (LBP) the ancient curse is now developing as a modern epidemic^[3]

Lumbar disc herniation seems to be one of the most frequent cause of LBP, nevertheless it is well known that many patients, complaining of LBP as well as radiating leg pain suggesting sciatica, did not show lumbar disc herniation in magnetic resonance imaging (MRI) and computed tomography (CT)^[4,5,6]

Almost 90% of the people around the world suffers from low back pain at any stage of life.

The most common causes of low back pain are intervertebral disc herniation and spinal stenosis which leads serious restriction in social lives.^[7] Epidural steroid injection is commonly used, minimally invasive, effective, low risky symptomatic treatment option of lumbar radiculopathy in patients with poor response to conservative treatment before any surgical procedure.

The first epidural injection made by sicard in 1901.^[8] Epidural steroid injections have been used from 1952 for the treatment of lumbar radiculopathy. Injections could be made blindly or under fluoroscopy or computed tomography (CT) guided.^[9,10] Blindly performed injections using interlaminar loss of resistance technique, it is cheap and rapid technique post-dural puncture headaches, epidural hematoma spinal cord injury, intravascular injection are potential complications.

Using imaging techniques could verify the needle placement by contrast injection fluoroscopy guided allows taking simultaneous images but it is hard to find epidural space in scoliosis patients and patients with large osteophytes or patients with narrow space.^[11]

Interlaminar epidural steroid injection is used in patients with posterior diffuse disc herniation. Transforaminal epidural steroid injections is used in patients with neural foraminal disc herniation, lateral reses or neural foraminal disc stenosis, neural root indentation.

This present study aims to evaluate the effectiveness of epidural steroid injection in the treatment of lumbar radiculopathy, compare the outcomes of pain response with transforaminal and interlaminar approaches. Aim of the study was to compare transforaminal and interlaminar epidural steroid injection for pain management in lumbar intervertebral disc prolapsed cases. Objectives was to observe improvement in Japanese Orthopaedic Association (JOA) score from baseline to 1 and at 6 month.

II. METHODOLOGY

This study was conducted in department of anaesthesia. With due permission from the institutional ethics committee and review board and written informed consent from patients were obtained. It is hospital based, comparative interventional study. The sample size calculated is 30 in each group at 95% confidence and power 80% to verify the minimum expected difference of 1.65(± 0.81) in improvement of JOA score from baseline to 6 month post injection of steroid in both group. Patients were allocated into 2 groups. (30 patients in each group) Group a (n=30) interlaminar group: received inj. 2% xylocaine (4ml)+methyl prednisolone 80 mg (2ml) Group b (n=30) transforaminal group: Receive inj.2%xylocaine (1ml) +methyl prednisolone 40 mg (1ml)

➤ Inclusion Criteria-

- Single disc buldge or protrusion diagnosed by MRI, ASA grade I and II Patients, age between 25 to 60 years, weight 40 to 70 kg.

➤ Exclusion Criteria

Migrated or sequestered herniation on imaging, motor deficit, cauda equina syndrome, segmental instability, history of allergic reaction to local anaesthetics or corticosteroids;

Collected data were analysed using SPSS version 23 software.

The continuous data will be summarized in form of Mean \pm SD. The difference in mean will be analyzed using the ANNOVA Test.

CHI-SQUARE test will be employed for comparison of side effect in between both groups.

III. RESULTS

In this study RESULTS; Total 60 patients were included in this study, in which 30 patients received epidural from interlaminar route and 30 patients received by transforaminal route. In group A age group 42.90 \pm 14.07 years patients participated in which 18 patients were male and 12 female.

All patients were of 45 to 85 kg weight with ASA grade 1 and 2.

Pre injection JOA score was 15.27 \pm 1.11 and after epidural steroid injection JOA score at 1st week to 6 months has been increased from 22.37 \pm 1.19 to 24.93 \pm 0.78.

Rate of improvement 50 to 74% (Fair) to 75 to 89% (good) at 1,2,3 week and 1,3,6 months after epidural injection.

In group B Age group 39.03 \pm 11.10 years patients participated in which 17 patients were male and 13 female.

All patients were of 54 to 78 kg weight with ASA grade 1 and 2.

Pre injection JOA score was 15.20 \pm 1.13 and after epidural steroid injection JOA score at 1st week to 6 months has been increased from 25.40 \pm 0.86 to 28.03 \pm 0.67.

Rate of improvement 50 to 74% (Fair) at 1 and 2 week after injection and 75 to 89% (good) at 1and 3 months after epidural injection and 90to 100% (excellent) at 6 months after epidural injection.

This difference was found to be statistically significant between both the groups (p<0.05).

	GROUP A	GROUP B
Age (yrs.)	42.90 \pm 14.07	39.03 \pm 11.10
Sex (M,F)	18,12	17,13
Weight (kg)	45 to 85 kg	54 to 78 kg
ASA grade (I,II)	24,6	26,4

Table 1:- Demographic data and baseline hemodynamic variables Age and weight expressed as (Mean + SD)

	Group A		Group B		Result (p value)
	Mean	SD	Mean	SD	
Pre injection score	15.27	1.11	15.20	1.13	0.818 (NS)
After 1 week	22.37	1.19	25.40	0.86	p<0.001 (S)
After 2 weeks	22.90	1.06	25.57	0.68	p<0.001 (S)
After 3 week	23.03	1.07	26.00	0.79	p<0.001 (S)
After 1 month	23.47	0.82	26.37	0.61	p<0.001 (S)
After 3 month	23.77	0.73	26.93	0.78	p<0.001 (S)
After 6 month	24.93	0.78	28.03	0.67	p<0.001 (S)

Table 2:- JOA score

S = Significant ; NS = Non Significant

Table 2 shows Japanese orthopaedic association scoring in both groups

The observations were compared with student t test.

The table shows mean JOA scoring in both groups.

It was observed that both groups show no significant difference in pre injection scoring (p>0.05)

It was observed that both groups show significant difference at different time intervals in JOA scoring (P<0.05)

	Group A		Group B		Result (p value)
	Mean	SD	Mean	SD	
After 1 week	51.34	9.52	73.59	6.78	p<0.001 (S)
After 2 week	55.30	8.50	74.91	4.91	p<0.001 (S)
After 4 week	56.26	8.61	78.13	5.63	p<0.001 (S)
After 1 month	59.34	6.56	80.85	4.04	p<0.001 (S)
After 3 months	61.64	6.06	84.94	5.53	p<0.001 (S)
After 6 months	70.27	5.99	92.94	4.84	p<0.001 (S)

Table 3:- Rate of improvement

Table 3 shows rate of improvement (R) in JOA score at different time intervals in both the groups. The observations were compared with student t test. Both the groups show statistically significant difference at different time interval (P<0)

IV. DISCUSSION

Initially, prolapsed disc was believed to cause back and leg pain by mechanically compressing the nerve roots. Now, it's well known that leakage of the contents of the nucleus pulposus, causes pain producing an inflammatory reaction in the disc itself, around the facet joint and a chemical neuro radiculitis due to the synthesis of various inflammatory mediators.^[12] The current study was designed

to measure the efficacy of epidural steroids in management of pain in patients with prolapse of lumbar intervertebral disc and to compare the effectiveness by two different routes of injection that is transforaminal and interlaminar. Similar study by Ackerman and Ahmed in their study reported the superiority of transforaminal route over interlaminar routes^[13]. There are several types of steroids available for epidural injection like hydrocortisone, betamethasone, triamcinolone and methylprednisolone. Due to its anti-inflammatory properties^[14] and long duration of action, we have used methylprednisolone in our patients. It also stabilizes neural membranes and suppresses ectopic neural discharges^[15] JOA scoring were compared in both the groups from pre injection score to 6 months after injection received on follow up JOA scores improved in both the groups from base line maximum score achieved after 6 month of injection ,increment in JOA score was higher in group b i.e. transforaminal route . rate of improvement was assessed in both the groups after injection to 6months of follow up, both groups had improvement from base line 50 to 70% improvement seen in group 1 and 70 to 90% improvement seen in group This study suggests that a transforaminal approach offers increased analgesic efficacy when compared to interlaminar approach . This may be due to increased ventral spread of steroid solution with better contact with the herniated disc .the precise delivery of the medication at the exact site of pathology may be the reason for higher efficacy of the transforaminal route.

Regarding the volume of injectate, Winnie et al have found that high volumes have no benefit over the low volume^[16]. For duration of less than 3 months, the success rate is 83-100%,^[17,18]

V. CONCLUSION

The management of low back pain due to prolapsed lumbar intervertebral disc by injecting methyl prednisolone in epidural space is satisfactory in current study. Both the routes of injections are effective but transforaminal route obtained best results after 1 month to 6 months after injection.It can be considered to be a good supportive treatment option now a days.

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