"FUNCTIONAL OUTCOME OF TRANSFORAMINAL V/S CAUDAL EPIDURAL STEROID INJECTIONS FOR THE MANAGEMENT OF LUMBAR AND LUMBOSACRAL DISC HERNIATION WITH RADICULOPATHY: A PROSPECTIVE, RANDOMIZED, CONTROLLED STUDY."

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INTRODUCTION

The attempt to understand pain represents one of the oldest challenges in the history of medicine. Pain is an unpleasant entity inviting prompt medical action, as a symptom and, therefore, is a single dreadful clinical feature making the patient to seek medical help early which in turn is immensely helpful in early diagnosis and prompt treatment. Pain has been defined by "Sherrington" a "psychical adjunct to imperative protective reflex".[1]

Back pain is one of the most common reasons for the patients to seek emergency care. It has a broad range of potential etiologies for both adult and pediatric populations. The etiologies differ depending on the patient population, but most commonly it is mechanical or non-specific in nature, causing significant disability. It is essential to find common red flags of back pain in both children and adults can guide the clinician to appropriate evaluation and treatment.[2]

In most of the people affected by low back pain substantial pain or disability is short lived and they soon return to normal activities regardless of any advice or treatment they receive. A small proportion, however, develop chronic pain and disability. There is a generally accepted approach to the management of back pain of less than 6 weeks' duration (acute low back pain). What has been less clear is how low back pain should be managed in people whose pain and disability has lasted more than six weeks. Appropriate management has the potential to reduce the number of people with disabling long-term back pain; and so reduce the personal, social, and economic impact of low back pain to society.[3]

Although precise epidemiologic data is not available, the prevalence of lumbosacral radiculopathy is approximately 3% to 5% of population, distributed equally in men and women. Men are most likely to develop symptoms in their 40s, whereas women are affected most commonly between ages 50 and 60.[4]

Musculoskeletal conditions such as back pain have a major impact on the health care system due to the combined high prevalence and associated disability. The total cost of back pain around the world is estimated to represent billions of dollars annually.[5]

Patients with lumbar radiculopathy typically present with a chief complaint of pain. The patient may experience the radiating pain as sharp, dull, piercing, throbbing, or burning. Pain caused by a herniated disc classically increases with bending forward, sitting, coughing, or (excessive) stress on the lumbar discs and can be avoided by lying down or sometimes by walking. Conversely, pain due to lumbar spinal- canal stenosis can typically increase during walking and improve immediately with bending forward.[6]

In addition to the pain, patients often report paresthesia in affected dermatomes.

Accurate diagnosis is important for treatment outcomes, with the ultimate aim of post-treatment pain relief. For the successful operative treatment of Lumbar Radiculopathy, a surgeon must identify the site of origin of pain.[7] No gold standard exists for delineating the involved nerve root in LR. The diagnostic techniques include symptomatology, physical examinations, electro-diagnostic study (EDX), magnetic resonance imaging (MRI), and selective nerve block (SNB).

Greater consistency could be obtained by combining clinical findings and Electrodiagnostic study, but abnormalities in Electrodiagnostic study were observed in fewer than 50% of patients with Lumbar Radiculopathy. For determining nerve root involvement, MRI is markedly sensitive but exhibits a low specificity. By contrast, Electrodiagnostic study is markedly specific but has a low sensitivity. Therefore, MRI and Electrodianostic study are currently considered complementary tools for identifying which nerve root is involved in Lumbar radiculopathy.[8]

There is little difference among the outcomes of patients treated with bed rest, physical therapy, or continuation of normal activities of daily living, so treatment should be tailored to provide maximum comfort. Analgesic medications, including nonsteroidal anti-inflammatory drugs, nonopioid analgesics (eg, tramadol), and, in some cases, narcotic analgesics should be used as indicated.[9]

Corticosteroid injections were considered as an efficient and safe choice. Complications from corticosteroid injection are rare. However Surgery particularly is the main treatment modality recommended for treatment leading to decrease in pain score. some researches show that ESIs combined with local anesthetics get a bettereffect

on pain relief and functional level in managing chronic low back pain. Therefore, it is necessary to add the local anesthetic during the injections.[10]

The two most common causes of complications of Epidural Steroid Injections are related to "inaccurate needle placement" and "medicine administration". Both types of injections may cause complications such as headache, soreness at the injection site, and toxicity. Caudal-ESI (C-ESI) is both the safest and the easiest epidural injection, and it does not always require fluoroscopic guidance. For the Caudal route, there may be an increased risk of needle tip placement anterior to the sacrum or into the rectum, whereas Transforaminal-ESI(T-ESI) carries an increased risk of trauma to the nerve root during needle placement, which may result in paraplegia in rare instances.[11]

Lumbar epidural steroid injection (LESI) is performed via a Transforaminal (TF), caudal (C), or interlaminar (IL) approach in the lumbar spine; these approaches offer different advantages and disadvantages, which may result in different outcomes.

Some relevant research has already been conducted comparing the effectiveness of the Transforaminal versus Interlaminar route, but no comparison of the Transforaminal versus Caudal route has been performed effectively. However, it remains debatable whether TF or C approaches should be utilized in clinical practice, and no definitivestandards pertaining to Lumbar Epidural Steroid Injection exist. It is therefore necessary to compare the clinical efficacies of different procedures to generate data that can be used to formulate clinical guidelines.[12]

Previous studies and systematic reviews of ESIs have been hampered by their designs, baseline differences between the treatment groups, inadequate sample sizes, and an inability to confirm the location of the injection because fluoroscopy was not used. [13]

Several factors may clinically influence the outcomes of ESIs, thereby influencing the choice of the route of administration. With increasing age, the risk of developing radicular pain is higher. Older patients also tend to experience worse outcomes. Patients with a high disease burden and psychopathology, such as depression and other forms of psychological distress, may also have a worse outcome. Furthermore, prolonged disease duration, lack of employment, smoking, and the nature of patients' symptoms, and may affect the ESI results.[14]

Hence; under the light of above mentioned data the present study was undertaken for assessing and comparing the efficacy of Transforaminaland Caudal Epidural Steroid Injections Outcome for the treatment of Lumbar Radiculitis.

AIMS AND OBJECTIVES

- To assess and compare Transforaminal and Caudal epidural steroid injections for the management of radiating low back pain secondary to lumbar or lumbosacral disc herniation.

MATERIAL AND METHODS

Study Setting

- MMIMSR, MMDU, MULLANA, AMBALA.

Study Design

- A Prospective, Randomized, Controlled Study.

Sample Size:

Taking reference from previous study,[15] observed outcome scores of two groups were 23.65±5.741 and 14.9±6.872. Assuming similar results will be obtained in the study, the sample size was calculated with formula as follows –

$n = (Z_{\alpha/2} + Z_{\beta})^2 \times 2 \times \sigma^2 / d^2$

Where: $Z_{\alpha/2}$is 1.96

Z_{β} is 0.84

σ is 5.741

d is difference b/w 2 means (23.65 – 14.9)

Sample size came out to be 7 for each group.

Though sample size came out to be 7 for each group, but for better results of the study we intend to include 15 patients in each group.

Randomization:

Patients will be randomized to 2 treatment groups using computer generated randomization, online tool: www.graphpad.com

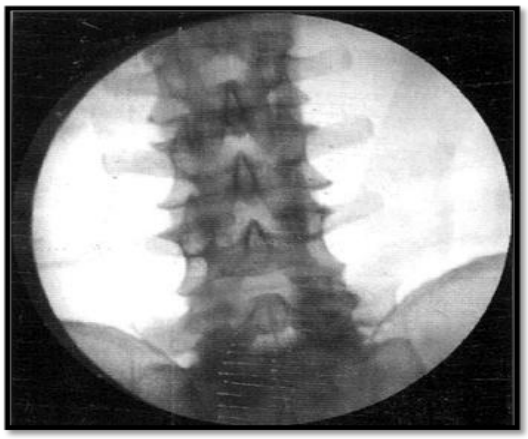
Techniques:

- **Transforaminal Technique**

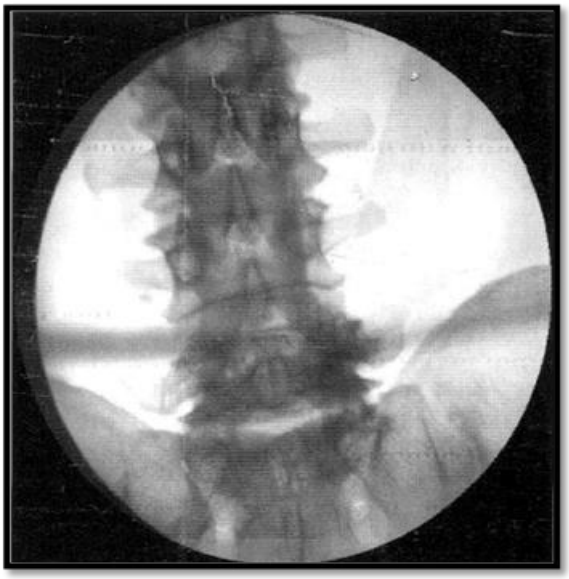
With all aseptic precautions in group A (TRANSFORAMINAL), Place the patient in prone position with pillow of appropriate size under abdomen to correct lordosis as depicted in the image below:

After attaching basic monitoring equipments patient was painted and draped to maintain aseptic conditions.
C-arm in AP position with x-ray tube below the patient. Adequate working space between patient and image intensifier was maintained.

AP image was taken with spinous process exactly in the midline.



(AP image of Lumbar Spine with spinous process in midline)
Align end plate of the target vertebral body by cranio caudal tilt. For upper lumbar vertebra move image intensifier caudally and for lower vertebra move image intensifier cranially.

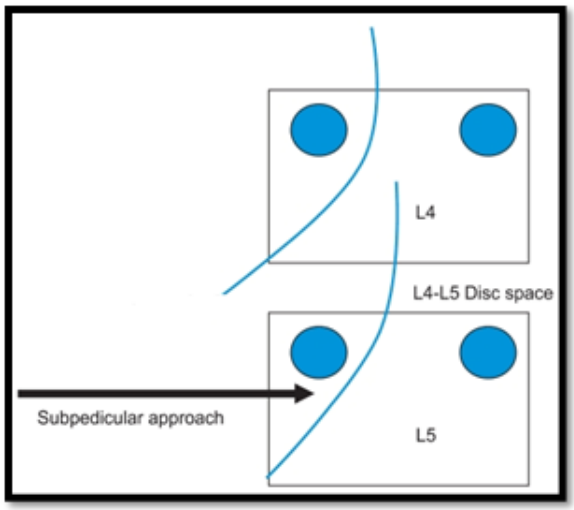


(AP view after squaring of vertebra)

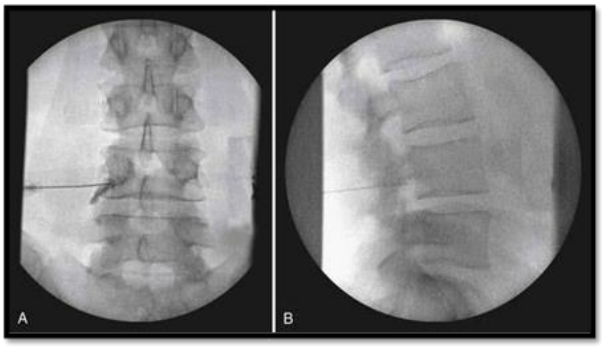
Then image intensifier is tilted to ipsilateral oblique till superior articular process of the inferior vertebra align with 6'o clock position of pedicle ofvertebra above. Needle entry is targeted at 6'o clock position of the pedicle. Skin infilterated with 1% Lignocaine and Wait for one minute.

22G spinal needle is inserted so as to hit the bone just above 6'o clock position of pedicle. Then needle tip is slipped down the pedicle by slightly by turning the tip. Now move the C-arm to a lateral position. Ideal placement of the needle is in Posterior-Superior quadrant of the foramen.

Confirm the needle position in AP, Oblique and Lateral views. After negative aspiration inject 1ml of dye and the spread of the contrast material should delineate the nerve root only.

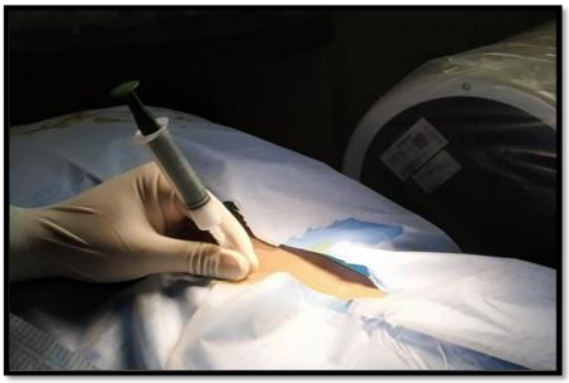


Schematic description of the "Nerve Root canal"



Fluoroscopic Image showing flow of the dye in the "Nerve Rootcanal"

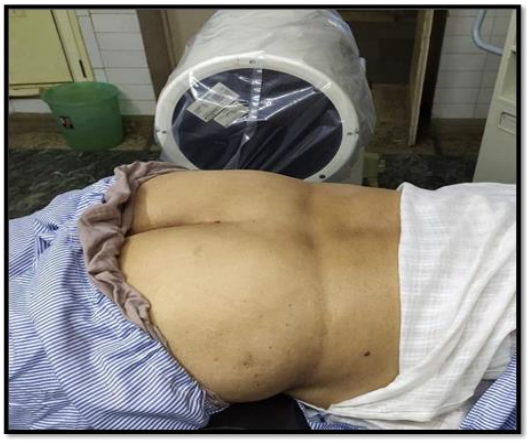
Using this Subpedicular Approach, After ruling out intravascular, intraneural needle placement, 1ml of prepared agent {Bupivacaine 1ml (0.5% Preservative free) along with 1ml of Lignocaine (2%) and 1ml of methylprednisolone(40mg) } was injected at the exit zone at the distal site of the nerve root canal.



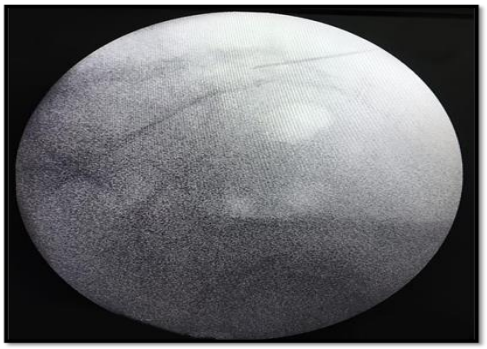
Patient was monitored in post procedure room for at least 1hour for vitals, any muscle weakness, fresh bleeding, and sedation etc and then discharged.

- **Caudal Technique:**

With all aseptic precautions, in group B (CAUDAL), Place the patient in prone position with pillow of appropriate size under iliac crest to correct lordosis as depicted in the image below



Take AP image under image intensifier and mark the midline of the sacral hiatus. Now the C-arm is turned to lateral view and the sacral hiatus is identified. Needle entry is few cms below the sacral hiatus at and angle of 30-45 degree. Infilterate the needle entry with 1% lignocaine and wait for one minute. 18G epidural needle is inserted and hit the posterior surface of S5 vertebral body just below sacral hiatus and then insertion angle is decreased so as to slip into sacrococcygeal membrane. Inserted further for few cms in sacral canal.



After ruling out intravascular, subdural and subarachnoid needle position prepared agent was injected containing Bupivacaine 9ml (0.5% preservative free) along with with 1ml methylprednisolone (40mg) into the sacral hiatus. Patient was monitored in post procedure room for at least 1hour for vitals, any muscle weakness, fresh bleeding, and sedation etc and then discharged.

Method of Collection of Data:

- Patients with radiating low back pain satisfying the inclusioncriteria were selected.
- Informed and written consent was taken.
- History taken.
- Clinical examination both local and systemic was done toassess the cause of instability.
- Radiological examination using X-ray, CT scan and otherimaging modalities were done.
- Investigations –Baseline and others were done.
- Diagnosis-Clinical and radiological was established.
- The Patients were randomly allocated to one of the two groupsof 15 patients each.
  - Group A – For Transforaminal approach.
  - Group B- For Caudal approach.
- With all aseptic precautions, in group I, needle was placed in epidural space with the patient in prone position under fluoroscopic guidance and Bupivacaine 1ml (0.5% Preservative Free) along with 1ml lignocaine (2%) and Methylprednisolone 1ml (40mg) is injected using Subpedicular approach.
- With all aseptic precautions, in group II, needle was placed in epidural space with the patient in prone position under fluoroscopic guidance, Bupivacaine 9ml (0.5% Preservative Free) along with Methylpredniso-lone 1ml (40mg) is injected into the Sacral Hiatus.
- Patient monitored for ~2hours after the procedure and observed for side effects, if any.

Study population:

- **INCLUSION CRITERIA:**

1. Age between 18 to 75 years
2. Magnetic resonance imaging (MRI) evidence of herniated disc at level corresponding with symptoms and clinical findings.
3. Radiating back pain with no relief after twelve weeks of conservative therapy.
4. A score of greater than 20% on the Oswestry Low Back Pain Disability Questionnaire.

- **EXCLUSION CRITERIA:**

1. Patient refusal for the procedure.
2. Patients requiring early surgical intervention like severe weakness, cauda equina syndrome, etc.
3. Patient with history of allergy to steroids and local anesthetic agents.
4. Previous lumbar spine surgeries.
5. Pregnancy or lactating women.
6. Recent vertebral compression fractures.
7. Patients with uncontrolled diabetes mellitus.
8. Lumbar radiculopathy secondary to malignant and infective conditions.

The patients fulfilling the inclusion and exclusion criteria were included in the study. Informed consent was obtained from all the participants. Clinical profile of the subjects was obtained and details were filled in a proforma. The main points recorded were the Age, sex, Oswestry Disability Index (ODI) score, Visual Analouge Scale (VAS) score, clinical and MRI diagnosis. Functional outcome was assessed at interval (preprocedural baseline) and subsequently on follow up visits at 1week, 6 weeks and 6 months post injection.
On each visit ODI and VAS score was recorded in the case sheet.

OBSERVATIONS AND RESULTS

TABLE 1: AGE-WISE DISTRIBUTION OF PATIENTS

Age group (years)	GROUP A		GROUP B	
	Number	Percentage	Number	Percentage
18-30	2	13.33	3	16.67
31-40	3	16.67	2	13.33
41-50	5	33.33	4	30
51-75	5	33.33	6	36.67
MEAN ± SD	44.7 ± 9.91		44.2 ± 10.79	

70 percent of the patients of Group A and 66.67 percent of the patients of Group B belonged to the age group of 41 to 60 years. Mean age of the patients of Group A and Group B was 44.7 years and 44.2 years respectively.

FIGURE 1: AGE-WISE DISTRIBUTION OF PATIENTS

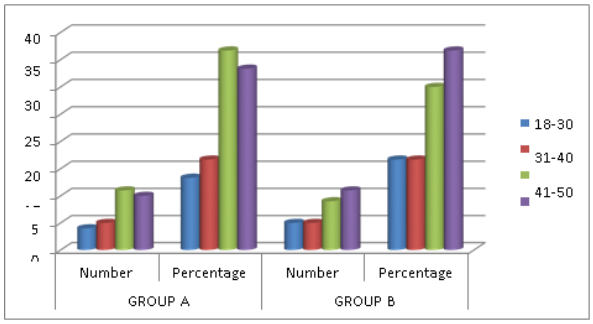


TABLE 2: GENDER-WISE DISTRIBUTION

Gender	GROUP A		GROUP B	
	Number	Percentage	Number	Percentage
Males	6	40	5	33.33
Females	9	60	10	66.67
Total	15	100	15	100

60 percent of the patients of Group A and 66.67 percent of the patientsof Group B were females while the remaining were males.

FIGURE 2: GENDER-WISE DISTRIBUTION

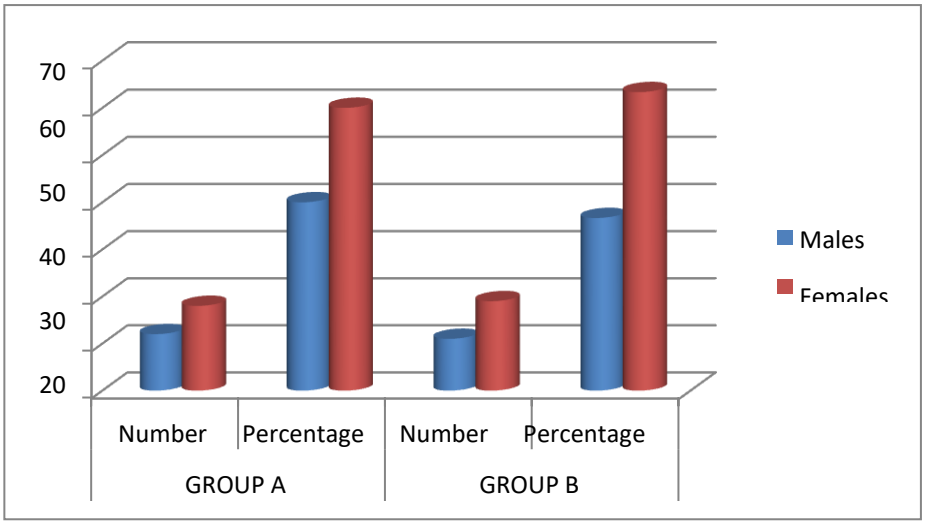


TABLE 3: MEAN VAS SCORE

Time interval	GROUP A		GROUP B		p- value
	Mean	SD	Mean	SD	
Pre-injection	6.8	2.4	7.1	2.8	0.85
Post- last injection	4.1	1.9	4.7	2.1	0.00 (S)
Post- last injection 1 week	3.9	1.7	4.6	1.9	0.00 (S)
Post- last injection 6 weeks	3.7	1.8	4.3	1.7	0.00 (S)
Post- last injection 6 months	3.6	1.4	4.1	1.6	0.00 (S)

Mean VAS among the patients of Group A at pre-injection, post-last injection, 1 week post-last injection, 6 weeks post-last injection and 6 months post-last injection was 6.8, 4.1, 3.9, 3.7 and 3.6 respectively. Mean VAS among the patients of Group B at pre-injection, post-last injection, 1 week post-last injection, 6 weeks and 6 months post-last injection was 7.1, 4.7, 4.6, 4.3 and 4.1 respectively. Mean VAS for the patients of Group A was significantly lower in comparison to the patients of group B at post-last injection, 1 week post-last injection, 6 weeks and 6 months

post-last injection.

FIGURE 3: MEAN VAS SCORE

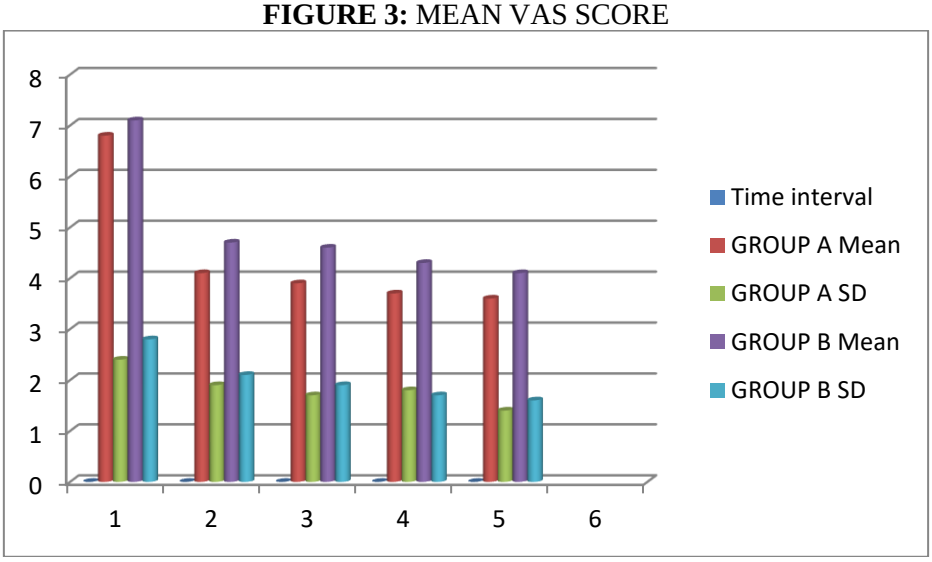


TABLE 4: ODI SCORE

Time interval	GROUP A		GROUP B		p- value
	Mean	SD	Mean	SD	
Pre-injection	58.9	9.4	60.3	8.7	0.77
Post- last injection	26.3	4.8	30.1	4.3	0.02 (S)
Post- last injection 1 week	23.1	4.3	29.7	4.1	0.01 (S)
Post- last injection 6 weeks	22.8	3.7	27.1	2.6	0.01 (S)
Post- last injection 6 months	20.1	3.7	25.8	2.6	0.01 (S)

Mean ODI among the patients of Group A at pre-injection, post-last injection, 1 week post-last injection, 6 weeks third-injection and 6 months post-last injection was 58.9, 26.3, 23.1, 22.8 and 20.1 respectively. Mean ODI among the patients of Group B at pre-injection, post-last injection, 1 week post-last injection, 6 weeks third-injection and 6 months post-last injection was 60.3, 30.1, 29.7, 27.1 and 25.8 respectively. Mean ODI for the patients of Group A was significantly lower in comparison to the patients of group B at post-last injection, 1 week post-last injection, 6 weeks post-last injection and 6 months post-last injection time interval.

FIGURE 4: MEAN ODI SCORE

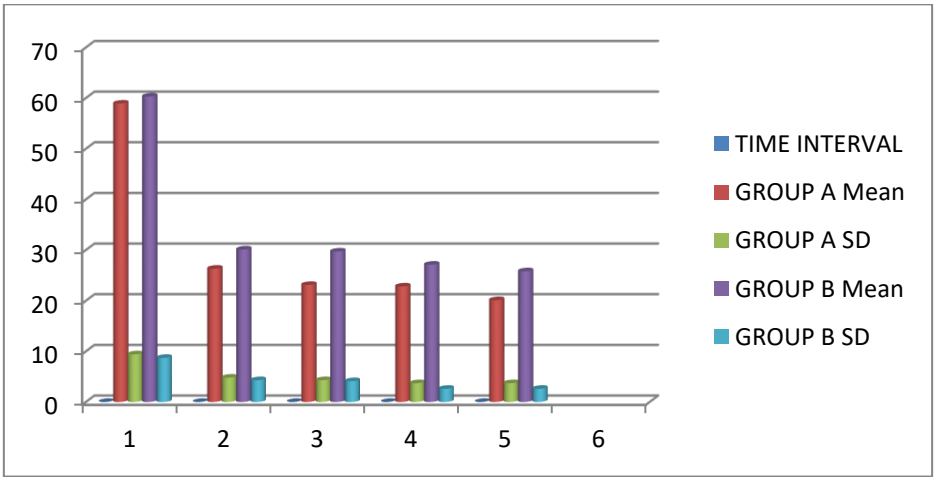


TABLE 5: COMPARISON OF MEAN VAS SCORE WITHINGROUP A

Parameter	Pre-injection		Post-last injection 6 weeks		p- value
	Mean	SD	Mean	SD	
VAS score	6.8	2.4	3.6	1.4	0.000

Among group A, while comparing the mean VAS score at pre-injection and 6 weeks post-last injection, significant results were obtained.

FIGURE 5: COMPARISON OF MEAN VAS SCORE WITH IN GROUP A

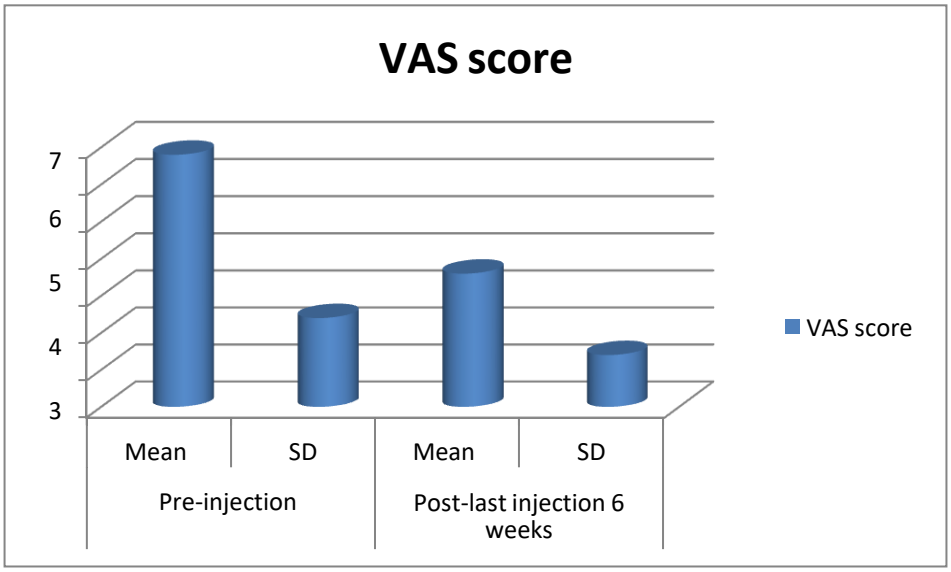


TABLE 6: COMPARISON OF MEAN VAS SCORE WITHINGROUP A

Parameter	Pre-injection		Post-last injection 6 months		p- value
	Mean	SD	Mean	SD	
VAS score	6.8	2.4	5.9	2.2	0.135

Among group A, while comparing the mean VAS score at pre-injection and 6 months post-last injection, non-significant results were obtained.

FIGURE 6: COMPARISON OF MEAN VAS SCORE WITH IN GROUP A

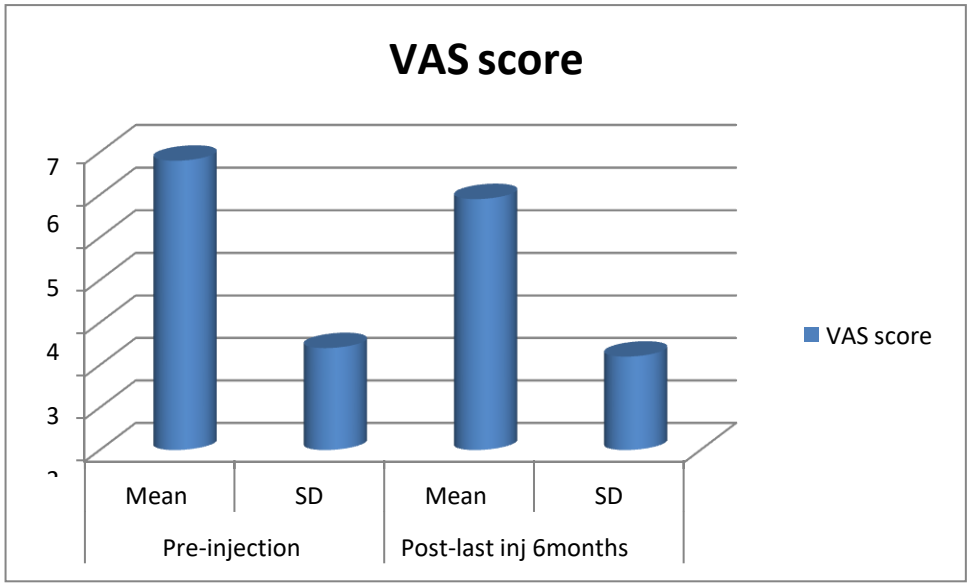


TABLE 7: COMPARISON OF MEAN VAS SCORE WITHINGROUP B

Parameter	Pre-injection		Post-last injection 6 weeks		p- value
	Mean	SD	Mean	SD	
VAS score	7.1	2.8	4.1	1.6	0.000

Among group B, while comparing the mean VAS score at pre-injection and 6 weeks post-last injection, significant results were obtained.

FIGURE 7: COMPARISON OF MEAN VAS SCORE WITHIN GROUP B

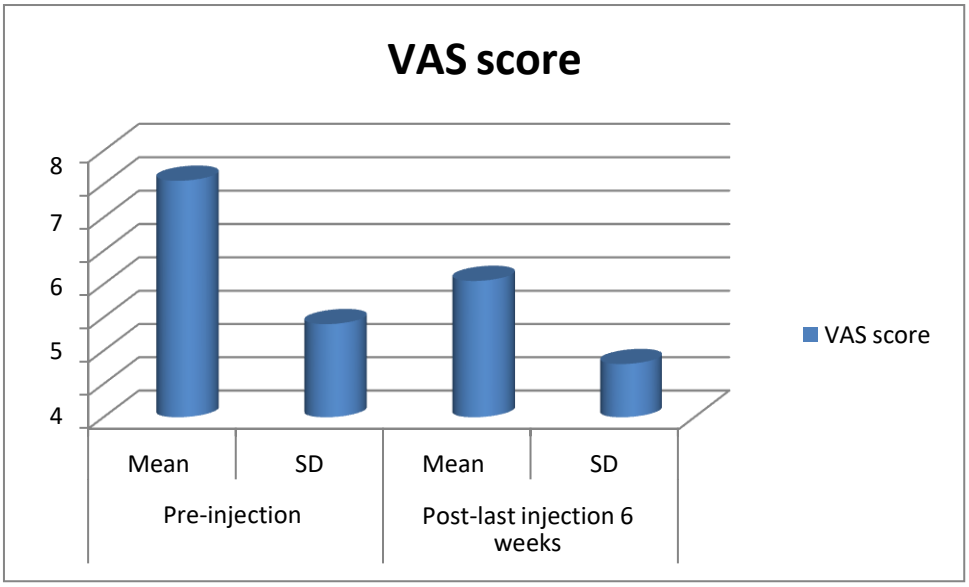


TABLE 8: COMPARISON OF MEAN VAS SCORE WITHINGROUP B

Parameter	Pre-injection		Post-last injection 6 months		p- value
	Mean	SD	Mean	SD	
VAS score	7.1	2.8	5.8	2.1	0.059

Among group B, while comparing the mean VAS score at pre-injection and 6 months post-last injection, non-significant results were obtained.

FIGURE 8: COMPARISON OF MEAN VAS SCORE WITHIN GROUP B

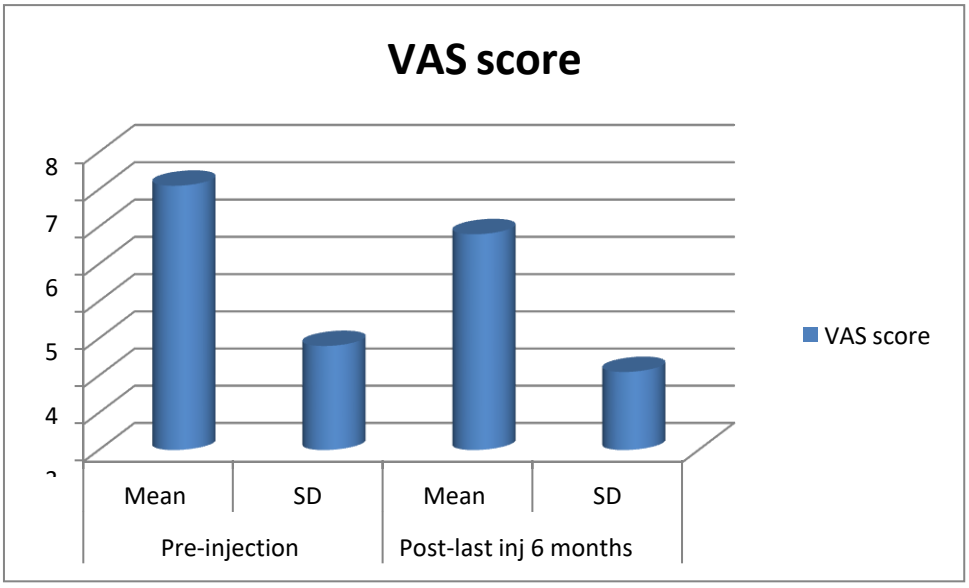


TABLE 9: COMPARISON OF MEAN ODI SCORE WITHINGROUP A

Parameter	Pre-injection		Post-last injection 6 weeks		p- value
	Mean	SD	Mean	SD	
ODI score	58.9	9.4	20.1	3.7	0.000

Among group A, while comparing the mean ODI score at pre-injection and 6 weeks post-last injection, significant results were obtained.

FIGURE 9: COMPARISON OF MEAN ODI SCORE WITHIN GROUP A

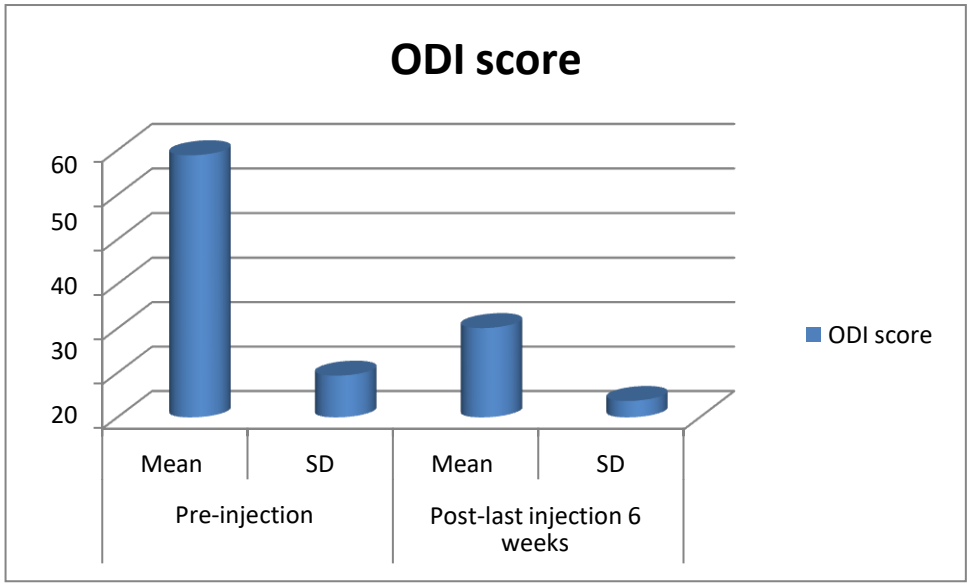


TABLE 10: COMPARISON OF MEAN ODI SCORE WITHIN GROUP A

Parameter	Pre-injection		Post-last injection 6 months		p- value
	Mean	SD	Mean	SD	
ODI score	58.9	9.4	39.4	4.7	0.001

Among group A, while comparing the mean ODI score at pre-injection and 6 months post-last injection, significant results were obtained.

FIGURE 10: COMPARISON OF MEAN ODI SCORE WITHIN GROUP A

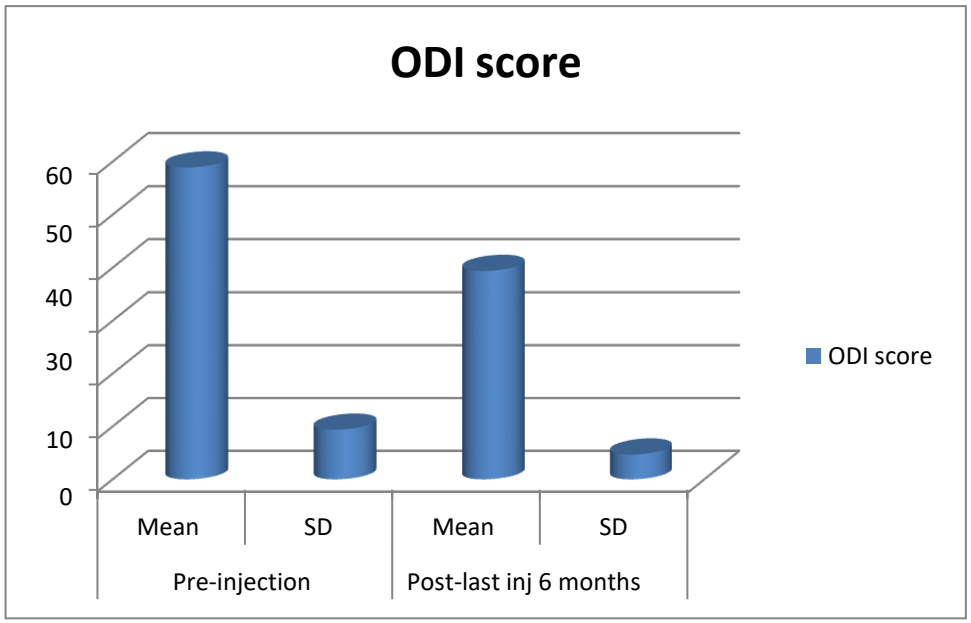


TABLE 11: COMPARISON OF MEAN ODI SCORE WITHIN GROUP B

Parameter	Pre-injection		Post-last injection 6 weeks		p- value
	Mean	SD	Mean	SD	
ODI score	60.3	8.7	25.8	2.6	0.000

Among group A, while comparing the mean ODI score at pre-injection and 6 weeks post-last injection, significant results were obtained.

FIGURE 11: COMPARISON OF MEAN ODI SCORE WITHIN GROUP B

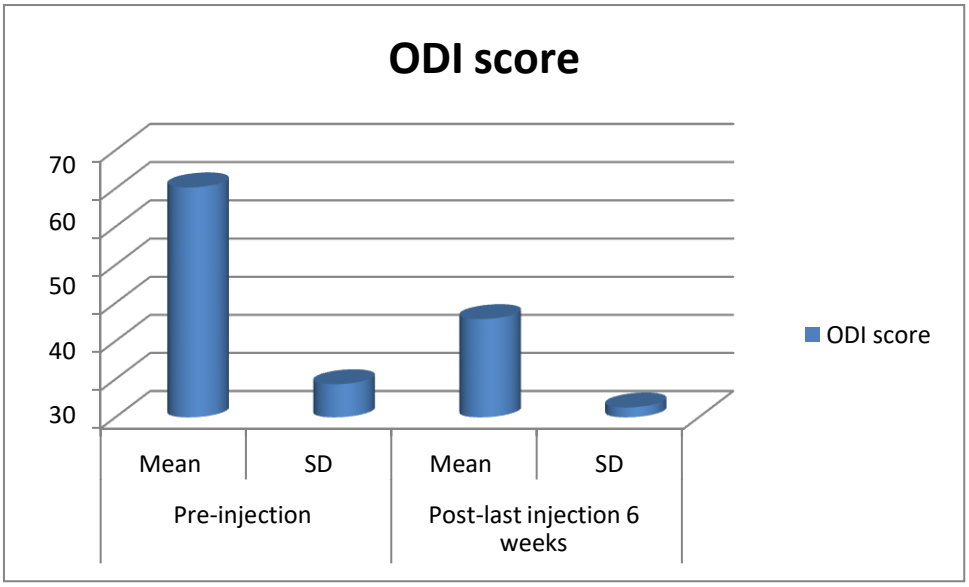
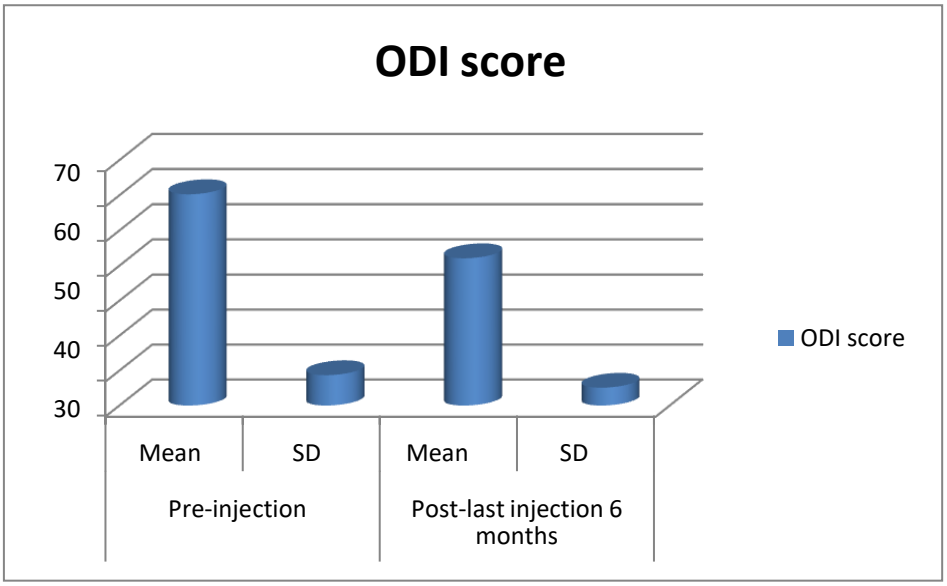


TABLE 12: COMPARISON OF MEAN ODI SCORE WITHIN GROUP B

Parameter	Pre-injection		Post-last injection 6 months		p- value
	Mean	SD	Mean	SD	
ODI score	60.3	8.7	42.1	5.1	0.000

Among group A, while comparing the mean ODI score at pre-injection and 6 months post-last injection, significant results were obtained.

FIGURE 12: COMPARISON OF MEAN ODI SCORE WITHIN GROUP B



DISCUSSION

Low back pain is pain, muscle tension, or stiffness localised below the costal margin and above the inferior gluteal folds, with or without leg pain, and is defined as chronic when it persists for 12 weeks or more. Non-specific low back pain is pain not attributed to a recognisable pathology (such as infection, tumour, osteoporosis, rheumatoid arthritis, fracture, or inflammation).[16]

Pain is non-specific in about 85% of people. About 4% of people with low back pain in primary care have compression fractures, and about 1% have a tumour. The prevalence of prolapsed intervertebral disc among people with low back pain in primary care is about 1% to 3%. Ankylosing spondylitis and spinal infections are less common. Thisreview only covers chronic low back pain where a definitive diagnosis cannot be made. Risk factors include heavy physical work; frequent bending, twisting, and lifting; and prolonged static postures. Psychosocial risk

factors include anxiety, depression, and mental stress at work. Having a previous history of low back pain and a longer duration of the present episode are significant risk factors for chronicity. One systematic review of prospective cohort studies found that some psychological factors (distress, depressive mood, and somatisation)are associated with an increased risk of chronic low back pain. Individual and workplace factors have also been reported to be associated with the transition to chronic low back pain.[17]

Generally, the clinical course of an episode of low back pain appears favourable, but back pain among people in a primary-care setting typically has a recurrent course (characterised by variation and change), rather than an acute, self-limiting course. Most people with back pain have experienced a previous episode, and acute attacks often occur as exacerbations of chronic low back pain. In general, recurrences will occur more frequently and be more severe if people have had frequent or long-lasting low back pain complaints in the past.[18-21]

Epidural steroid injections have been used from 1952 for the treatment of lumbar radicular pain. Injections could be made blindly or under either fluoroscopy or Computed Tomography (CT) guidance. Blindly performed injections, using interlaminar loss of resistance technique has 13-30% incidence of improper localization of the space. Although it is a cheap and rapid technique dural puncture, post dural puncture headaches, epidural hematoma, spinal cord injury, intravasculary injection are the potential complications. Epidural steroid injection using imaging techniques could verify the needle placement by contrast injection. Fluoroscopy guided epidural injection allows taking simultaneous images but it is hard to find epidural space by fluoroscopy in patients with scoliosis, large osteophytes or disc space narrowing. CT which has higher spatial resolution shows anatomic details and the accurate localization of the needle superior to fluoroscopy. The complication rate is much rarer. A common concern isthat CT may be associated with higher radiation doses compared with fluoroscopy. Schmid et al. compared the radiation dose of CT guided and fluoroscopy guided lumbar spinal injections and found the effective dose to be similar for both modalities.[19-21]

Complications after Caudal epidural injections(CEI) include insomnia the night of the injection, transient nonpositional headaches that resolve within 24 hours, increased back pain, facial flushing, vasovagal reactions, episodes of nausea, and increased leg pain. In the recent past, transforaminal epidural injections have gained rapid and widespread acceptance for the treatment of lumbar and lower extremitypain. 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.[19-21]

Hence; under the light of above mentioned data the present study was undertaken for assessing and comparing the efficacy of Transforaminaland Caudal Epidural Steroid Injections Outcome for the treatment of Lumbar Radiculitis.

Age-wise distribution

In the present study, mean age of the patients of Group A and group B was 44.7 and 44.2 years respectively. Comparable results were obtained while assessing the age-wise distribution of patients. Ourresults were in concordance with the results of previous authors who also reported similar findings in their respective studies.

In a study conducted by Manchikanti L et al, mean age of the patientsof the caudal group and Transforaminal group was 45.9 and 42.8 years respectively.[22]

In another study conducted by Ploumis A et al, mean age of the patients of the caudal group and Transforaminal group was 67.2 and 64.7 years respectively.[23]

Gender-wise distribution

60 percent of the patient of Group A and 66.67 percent of the patients of Group B were females. Comparable results were obtained while assessing the gender-wise distribution of patients. Our results were in concordance with the results of previous authors who also reported similar findings in their respective studies.

In a study conducted by Rahatli et al, 87 patients of chronic back pain were enrolled among which 19.54 percent were males while remaining 80.45 percent were females.[24]

In another study, conducted by Manchikanti L et al, 65 percent of the patients of the caudal group and 69 percent of the patients of the Transforaminal group were females.[22]

Mean VAS Score

Mean VAS among the patients of Group A at pre-injection, post-last injection, 1 week post-last injection, 6 weeks third-injection and 6 months post-last injection was 6.8, 4.1, 3.9, 3.7 and 3.6 respectively. Mean VAS among the patients of Group B at pre-injection, post-last injection, 1 week post-last injection, 6 weeks third-injection and 6 months post-last injection was 7.1, 4.7, 4.6, 4.3 and 4.1 respectively. Among group A, while comparing the mean VAS score at pre-injection and 6 weeks post-last injection, significant results were obtained. Also, among group B, while comparing the mean VAS score at pre-injection and 6 weeks post-last injection, significant results were obtained. Among group A, while comparing the mean VAS score at pre-injection and 6 months post- last injection, non-significant results were obtained. Among group B, while comparing the mean VAS score at pre-injection and 6 months post- last injection, non-significant results were obtained.

Therefore; both the techniques effectively lead to reduction in pain on subsequent short-term and mid-term follow-ups. Our results were in concordance with the results obtained by previous authors who also reported significant improvement in the mean pain scores among patients of caudal and Transforaminal group.

The efficacy of ESIs by the caudal route has been evaluated in two systematic reviews by Boswell et al. and Abdi et al.. Both reviews concluded that the evidence of efficacy for discal pathology was strong for short-term and moderate for long-term pain relief. Similar conclusions were reported in the recent systematic review by Conn et al, dealing with epidural injections in general.[20,21,25]

In a study conducted by Rahatli FK et al, mean VAS scores among the patients of the Transforaminal group at pre-injection, post-injection 15th day, post-injection 3rd month and post-injection 6th month was 8.22, 3.65, 3.61 and 3.65 respectively.[24]

Karaeminogulları et al. made 46 CT guided TFESI to 42 patients and have found 95% successful outcome in 6 months follow up.[22]

In the present study, while comparing the mean VAS scores at subsequent follow-ups in between the two study groups, it was observed that mean VAS score was significantly lower among patients of the Transforaminal group in comparison to the caudal group. Our results were in concordance with the results obtained by Ploumis P etal and Lee JH et al who also reported similar findings in their respectivestudies.[15,19]

In the meta-analysis conducted by Lee JH et al, authors investigated whether TF-ESI was more useful than C-ESI for achieving clinical outcomes in patients with LDH. Among six studies, four articles supported the superiority of TFESI to CESI, one article showed no significant difference, and one article supported the superiority of CESI to TFESI. To obtain compatible or superior clinical results to TFESI, CESI might need to inject a larger amount of medication than was usually used. This meta-analysis showed short-term and long-term trends toward better clinical efficacy with TFESI than with CESI without statistical significance. The evidence level was low because of inconsistency and imprecision.[15]

In another study conducted by Ploumis P et al evaluated prospectively the efficacy of caudal epidural steroid injection (CESI) and Transforaminal epidural steroid injection (TFESI) in lumbar spinal stenosis patients with sciatic pain. Thirty-one patients from two hospitals, with single dermotomal distribution of sciatic pain due to spinal stenosis were included in the study. Patients underwent epidural steroid injections done by the same injectionist. Eleven patients from one hospital were included in the CESI group, while the TFESI group consisted of 20 comparable patients from the second site. Primary outcome measure was the complete relief or at least 50% reduction of pain (visual analog scale [VAS]) at 6 months postinjection. Secondary outcome measures were the improvement of function (of at least 15 points of Oswestry Disability Index [ODI]) at 6 months and the changes of VAS and ODI and at 2 weeks, at 3 months, and at 6 months post- injection. A significantly greater number of stenosis patients showed pain relief at 6 months post-injection with TFSI (90%) than with CESI (54.54%). The effectiveness of transforaminal steroid injection for the stenosis patients with sciatica was superior to caudal at 6 months post- injection.[19]

ODI score

Mean ODI among the patients of Group A at pre-injection, post-last injection, 1 week post-last injection, 6 weeks third-injection and 6 months post-last injection was 58.9, 26.3, 23.1, 22.8 and 20.1 respectively. Mean ODI among the patients of Group B at pre-injection, post-last injection, 1

week post-last injection, 6 weeks third-injection and 6 months post-last injection was 60.3, 30.1, 29.7, 27.1 and 25.8 respectively. Among group A, while comparing the mean ODI score at pre-injection and 6 weeks post-last injection, significant results were obtained. Also, among group B, while comparing the mean ODI score at pre- injection and 6 months post-last injection, significant results were obtained.

Among group A, while comparing the mean ODI score at pre-injection and 6 months post-last injection, significant results were obtained. Among group B, while comparing the mean ODI score at pre-injection and 6 months post-last injection, significant results were obtained. Therefore; both the techniques effectively let to reduction in pain on subsequent follow-ups.

In the present study, while comparing the mean ODI scores at subsequent follow-ups in between the two study groups, it was observed that mean ODI score was significantly lower among patients of the Transforaminal group in comparison to the caudal group. Our results were in concordance with the results obtained by Lutz GE et al and Lee JH et al who also reported similar findings in their respective studies.[15,25]

Lutz GE et al evaluated the efficacy of traditional transsacral (caudal) or translaminar (lumbar) administration of epidural steroids. 75.4% of patients had a successful long-term outcome, reporting at least a >50% reduction between preinjection and postinjection pain scores, as well as an ability to return to or near their previous levels of functioning after only 1.8 injections per patient (range, 1 to 4 injections). Of our patients, 78.3% were satisfied with their final outcomes. They concluded that Fluoroscopic transforminal epidural steroids are an effective nonsurgical treatment option.[25]

Ackerman and Ahmad observed that the caudal group experienced better functional improvement than the Transforaminal group whereas Ploumis et al observed the opposite due to difference in thedemographic and clinical profile of the patients along with extent, severity and duration of pain might have been responsible for the difference in the results in the above mentioned studies.[2,19]

SUMMARY AND CONCLUSION

In the present study, a total of 30 patients of chronic low back pain were analysed. All the patients were broadly divided into two study groups; Group A- included patients who received epidural injection by Transforaminal approach, while Group B- included patients who received epidural injection by caudal approach. Following observations were made:

- 70 percent of the patients of Group A and 66.67 percent of the patients of Group B belonged to the age group of 41 to 75 years.Mean age of the patients of Group A and Group B was 44.7 years and 44.2 years respectively.
- 60 percent of the patients of Group A and 66.67 percent of the patients of Group B were females while the remaining weremales.
- Mean VAS among the patients of Group A at pre-injection, post- last injection, 1 week post-last injection, 6 weeks post-last injection and 6 months post-last injection was 6.8, 4.1, 3.9, 3.7, and 3.6 respectively while those of Group B were 7.1, 4.7, 4.6, 4.3, and 4.1 respectively.
- Mean VAS for the patients of Group A was significantly lower in comparison to the patients of group B at post-last injection, 1 week post-last injection, 6 weeks post-last injection and 6 months post-last injection time interval.
- Among group A, while comparing the mean VAS score at pre- injection and 6 weeks post-last injection, significant results were obtained. Among group B, while comparing the mean VAS score at pre-injection and 6 weeks post-last injection, significant results were obtained.
- Among group A, while comparing the mean VAS score at pre- injection and 6 months post-last injection, non-significant results were obtained. Among group B, while comparing the mean VAS score at pre-injection and at 6 months post-last injection, non- significant results were obtained.
- Mean ODI among the patients of Group A at pre-injection, post- last injection, 1 week post-last injection, 6 weeks third-injection and 6 months post-last injection was 58.9, 26.3, 22.8, 23.1 and 20.1 respectively while those of Group B were 60.3, 30.1, 29.7, 27.1 and 25.8 respectively. Mean ODI for the patients of Group A was significantly lower in comparison to the patients of group B at post-last injection, 1 week post-last injection, 6 weeks post-last injection and 6 months post-last injection time interval.
- Among group A, while comparing the mean ODI score at pre- injection and 6 months post-last injection, significant results were obtained. Among group B, while comparing the mean ODI score at pre-injection and at 6 months post-last injection, significant results were obtained. Under the light of above obtained results,

following conclusion werewithdrawn:

- Epidural steroids in disc herniation and radiculitis are provided based on the pathophysiologic mechanism of inflammation. Consequently, epidural steroids have been recommended as effective in disc herniation and radiculitis secondary to their anti- inflammatory properties.
- Transforaminal approach exhibited superior efficacy and should be performed with increasing frequency.
- Before selecting a steroid injection route for the management of radicular pain, the benefits and risks of the approaches discussed herein must be taken into consideration.
- Additional studies must therefore be performed to guide clinical decision-making.
- The Short-term and Mid-term effects after both Transforaminal and Caudal Epidural steroid injections improved VAS and ODI Score; also Clinical Outcome and Quality of life But Transforaminal showed better results and quality of life for similar duration of comparison.
- The Long–term outcome after Both TF and Caudal Epidural steroid injections though improved VAS and ODI score along with clinical outcome and quality of life.

Statistical analysis:

All the results were summarized in Microsoft excel sheet and were analyzed by SPSS software. Chi- square test and student t test was used for assessment of level of significance.

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