

# **A PROSPECTIVE STUDY ON COMPARISON BETWEEN PATIENTS OF INTERVERTEBRAL DISC PROLAPSE TREATED BY SURGICAL METHOD AND THOSE TREATED BY EPIDURAL STEROID INJECTIONS**

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## **ABSTRACT**

The average age of the people, in the above-mentioned study was 46 years and it ranged from 35 years to 59 years. It was observed that males are more prone to disc prolapse according to the discussion above, however the proportion of females in this study is higher. Female to Male Ratio being 5.6: 4.4. SLRT is a clinical tool which accurately helps in evaluation of treatment modality that was used for screening the patient. The average duration of symptoms ranged from 2 months to 6 months.

This study focuses on to analyse and compare the functional outcome of patients with intervertebral disc prolapse patients in 50 patients, with clinical symptoms, signs and radiological evidence treated either by epidural steroid injection or discectomy with decompression surgery. The efficacy of each treatment options for lumbar intervertebral disc prolapse patients excluding disc bulge is analysed based on:

Functional assessment of post-epidural steroid injection/post- surgery

Need for invasive procedure when conservative management fails

## **Keywords**

intervertebral disc prolapsed, therapeutic, surgery, stenosis, management, invasive

## **INTRODUCTION**

Herniation of nucleus pulposus giving rise to sciatica is one of the most common problems faced by people in the working age group. The cause of loss of working days and healthcare bearing the brunt of it. The annual incidence is 1 to 5% [1-3]. If sciatica not treated with the correct modality leads to suffering, work efficiently, suffering in the general well-being and mental health of the patient with increased burden on the healthcare cost. A 10% of those treated conservatively will have to undergo surgical management. [6] Two poles set apart in managing the symptoms of sciatica by choosing the surgical or medical side of management and this study essentially helps in identifying the outcomes of those with minimally invasive and a surgical management with the risks and long-term benefits of the same by comparing the two modalities. Multitude of studies have dwelled upon this very controversy of the preferred management with varying results. [9-27]. Epidural steroid injection being a minimally invasive method has revitalised the scenario by improving the patient satisfaction by focal intervention at the desired site and altering the inflammatory markers, giving rise to the symptoms in the first place.

This study focuses on comparing the functional outcome of those treated with this minimally invasive and a higher morbidity option such as that of the discectomy and decompression so as to eliminate the cause of the morbidity and aid in increased long-term benefits. The prolapsed intervertebral disc is essentially defined as a tear of the annulus fibrosis and protrusion of nucleus pulposus causing a stenosis of either the spinal canal, foraminal narrowing or both. The MRI being the choice of investigation for confirmation of the diagnosis has superseded the need for other modalities as it is safe in most medical comorbidities without exposing the patient to undue exposure to those like ionising radiation of the like of a CT scan.

When a patient presents with a neurological deficit as severe as that of involving cauda equina leaves not much choice but immediate decompression of the affected. [6-8] region. Decompression of the compromised cord by laminectomy, discectomy coupled with stabilisation procedure such as posterior lumbar interbody fusion has been advocated in prolapsed discs. Comparison of the widely used OSWESTRY DISABILITY INDEX of the patients treated with either modality has been the support for this study as it extensively covers the various functional aspects commonly faced by the patient in a general population.

## **MATERIALS AND METHODS**

### **Source of Data**

A group of 50 pupils were shortlisted for the study. Those with a single level prolapsed at the lumbar disc were considered for the management for both modalities. Diagnosed with the help of MRI at SreeBalaji Medical College and Hospital from a period of July 2017 to December 2019. The recruitment of patients will end by December 2018 to have a minimum follow up of 6 months with a maximum follow up till 12 months. So the study period is spread over a period of 30 months.

### **Method Of Collection Of Data**

The patients who presented to the hospital with the symptoms of sciatica were evaluated clinically and confirmed to have been suffering with a prolapsed lumbar intervertebral disc at a single lumbar level from the 2017 to 2019 period. Those patients were advised admission and a routine battery of tests was ordered for so as to get them fit for either surgery or a trial of epidural steroid injection. The patients were divided in three groups based on the duration of the symptoms in those ranging from 2-4 months, 4-6 months, 6-8 months and evaluated by OSWESTRY DISABILITY INDEX pre intervention. Once the patient was deemed fit for interlaminar epidural steroid injection, under sterile aseptic precautions, patient was injected with the steroid and a local anaesthetic in the above mentioned method. Those selected for surgery underwent a discectomy with or without laminotomy with decompression with appropriate consent. Patients were operated under general anaesthesia under sterile aseptic precautions. Post procedure, the patients were subjected to antibiotic cover combination of Cefoperazone and Sulbactam for a period of 2 days and converted to oral antibiotic for another 3 days. Those that acquired a suspected wound site infection were given culture specific antibiotics for a period of 5 days or till the wound site discharge reduced. All the patients were subjected to a clinical examination which included various nerve tension signs and straight leg raising test compared in this study both pre intervention and post intervention and a format of Oswestry disability scoring was calculated both pre and post intervention in all the patients. The same comparison was done at the end of 6 and 12 months. Both for SLRT and ODI.

The OSWESTRY disability index has been discussed in the annexure and the calculation has been explained. This score consists of 10 essential parameters components:

1. Pain intensity
2. Whether personal care has been affected
3. Ability to lift weight
4. Ability to walk
5. Ability to sit
6. Ability to stand
7. Disturbance in sleep

8. Affection of Sex life
9. Disturbance in social life 10. Ability to travel

<b>Interpretation of scores</b>	The patient can cope with most living activities. Usually no
<b>0% to 20%: minimal disability:</b>	treatment is indicated apart from advice on lifting sitting and exercise.
<b>21%-40%: moderate disability:</b>	The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
<b>41%-60%: severe disability:</b>	Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
<b>61%-80%: crippled:</b>	Back pain impinges on all aspects of the patient's life. Positive intervention is required.
<b>81%-100%:</b>	These patients are either bed- bound or exaggerating their symptoms

**Table no. 6: - Interpretation of ODI scoring**

**Inclusion criteria:**

- Patients with prolapsed intervertebral disc pathology at the lumbar level diagnosed by MRI.
- Those belonging to the age group of 35 to 60 years.

**Exclusion criteria:**

- Failed back syndrome.
- Patients with disc bulge.
- Disc prolapse at more than one level.
- Secondary metastasis to spine.
- Associated with other pathological conditions.
- Those involving the caudaequina
- Patients presenting with worsening neurological deficits and / or foot drop

The operative procedure followed and the procedure of epidural steroid injection administered has been discussed in detail in the above part of this study.

## **RESULTS**

The present study was conducted at Department of Orthopaedics, SBMCH, Chennai. The study included total 50 subjects suffering from PIVD. Subjects were divided in 2 equal groups, one included 25 subjects who got treated with epidural steroid injection and the other group got treated with discectomy with laminotomy with decompression. The study included 20 males and 30 females.

**Table no.7 Distribution of study subjects according to age groups**

Age group(in years)	TotalN(%)
36-40	11(22.00)
41-45	8(16.00)
46-50	19(38.00)
51-55	06(12.00)
56-60	06(12.00)
<b>Total</b>	<b>50(100)</b>
<b>Mean <math>\pm</math> SD</b>	<b>46.52<math>\pm</math>6.41</b>
<b>Range</b>	<b>36-59</b>

Table no.7 shows distribution of study subjects according to age groups. Majority 19(38%) of cases belonged to age group of 46-50 years followed by 36-40 years in 11(22%) cases. 51-55 and 56-60 years group included equal number of cases i.e. 6(12%).

**Figure no.14 Distribution of study subjects according to gender**

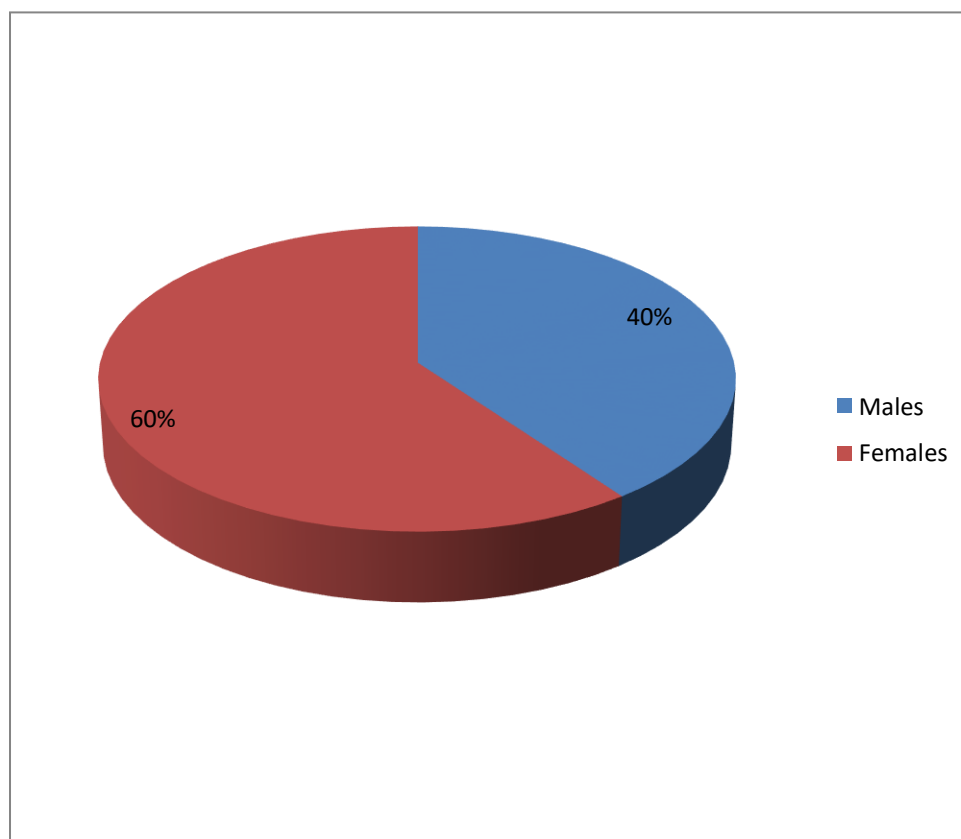


Figure no.14 shows distribution of study subjects according to gender.

**Table no.8 Distribution of study subjects according to diagnosis at presentation and gender**

Diagnosis	Males n(%)	Females n(%)	Total N(%)
Prolapsed IVD L3-L4	01(5.00)	03(10.00)	04(8.00)
Prolapsed IVD L4-L5	14(70.00)	20(66.67)	34(68.00)
Prolapsed IVD L5-S1	05(25.00)	07(23.33)	12(24.00)
<b>Total</b>	<b>20(100)</b>	<b>30(100)</b>	<b>50(100)</b>

Table no. 8 shows distribution of study subjects according to diagnosis at presentation Majority 34(68%) cases had PIVD at L4-L5 followed by PIVD at L5-S1 in 12(24%) cases. Majority 14(70%) males and females 20(66.67%) had PIVD at L4-L5 followed by PIVD at L5-S1 in 5(25%) males and 7(23.33%) females.

**Figure no. 15 Distribution of study subjects according to duration of pain at presentation and gender**

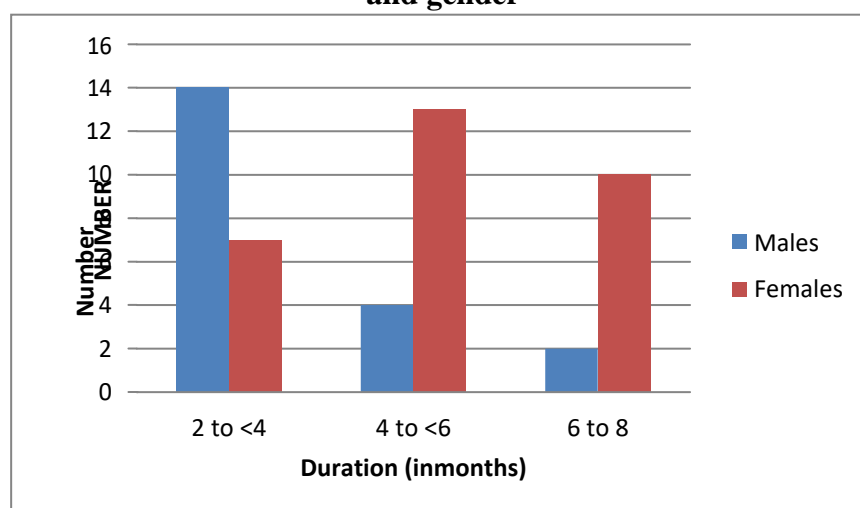


Figure no.15 distribution of study subjects according to duration of pain at presentation. Majority 21(42%) cases had duration of pain between 2 to <4 months followed by 4 to <6 months in 17(34%) cases. Majority 14(70%) males had duration of pain between 2 to <4 months. Majority 13(43.33%) females had duration of pain between 4 to <6 months

**Figure no. 16 Distribution of study subjects according to radicular pain**

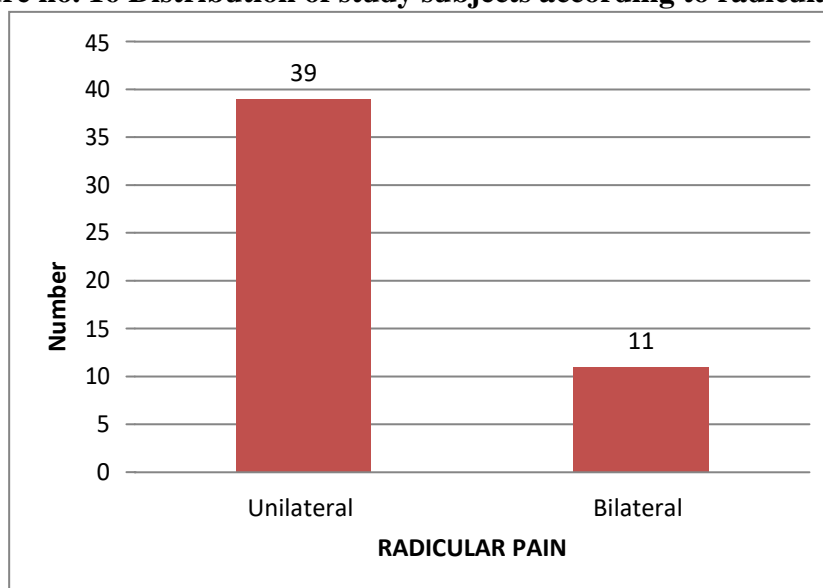


Figure no.16 shows distribution of study subjects according to radicular pain. Majority 39(78%) had unilateral radicular pain followed by 11(22%) having bilateral pain.

**Table no.9 Distribution of study subjects according to type of management and gender**

Type of management	Males n(%)	Females n(%)	Total N(%)
Epidural steroid injection	11(55.55)	14(46.67)	25(50.00)
Discectomy, laminotomy with decompression	09(45.00)	16(53.33)	25(50.00)
Total	20(100)	30(100)	50(100)

**Figure no.17 Distribution of study subjects according to type of management and gender**

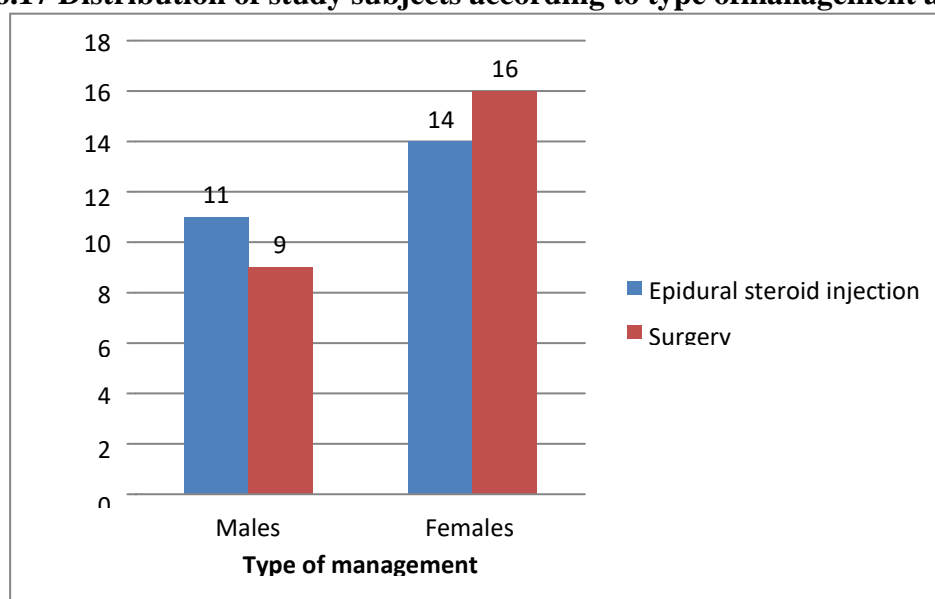


Table no.9 & figure no.17 shows distribution of study subjects according to type of management and gender. There were equal 25 (50%) cases undergoing epidural steroid injection and discectomy with laminotomy with decompression. Majority 11(55.55%) males underwent Epidural steroid injection and majority 16(53.33%) females underwent discectomy with decompression.

**Table no.10 Distribution of study subjects according to presence of post intervention complications**

Presence of post intervention complications	Males n(%)	Females n(%)	Total N(%)
Yes	02(10.00)	06(20.00)	08(18.00)
No	18(90.00)	24(80.00)	42(82.00)
Total	20(100)	30(100)	50(100)

Table no.10 shows distribution of study subjects according to presence post- intervention complications. Majority 42(82%) cases had no post- intervention complications. Majority 18(90%) of males and females 24(80%) had no post- intervention complications.

**Figure no. 18 Distribution of study subjects according to type of postintervention complications and gender**

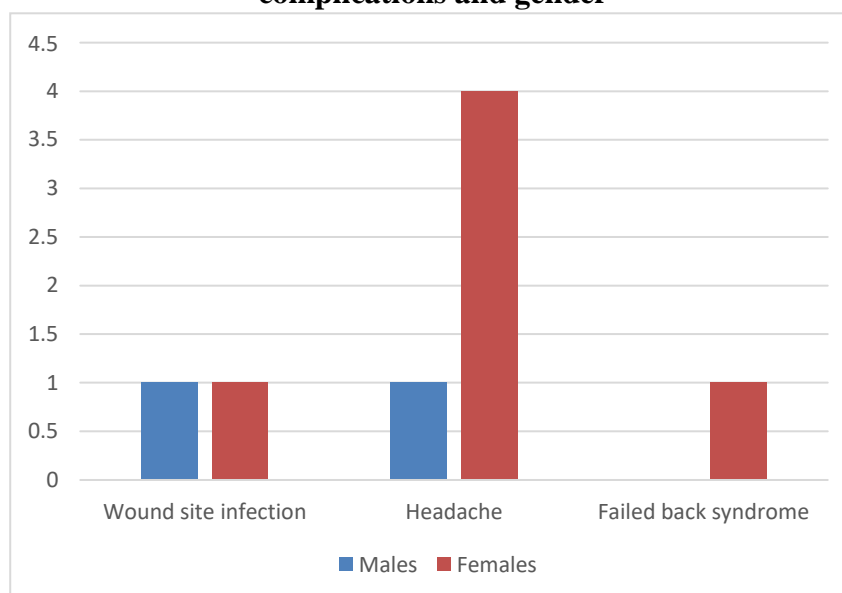
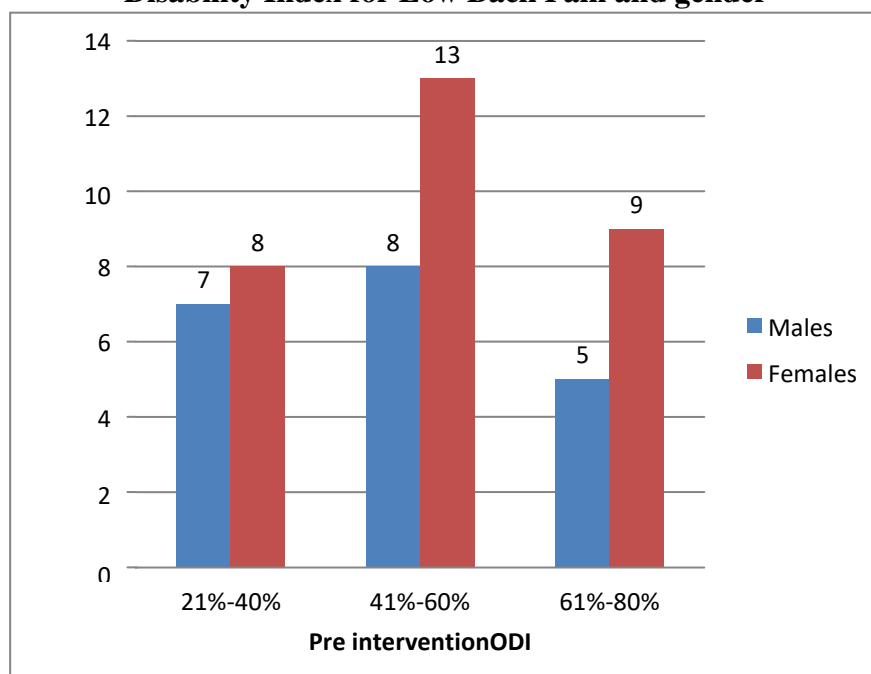


Figure no. 18 shows distribution of study subjects according to type of post- intervention complications. Out of total subjects, 8 had complications, out of which 2 were males and 6 were females. One male (50%) had wound site infection and one (50%) had headache. Out of 6 females, 1 had wound site infection, 04 had headache. Only one case had failed back syndrome and it was female.

**Figure no. 19 Distribution of study subjects according to pre-intervention Oswestry Disability Index for Low Back Pain and gender**



## DISCUSSION

Lumbar disc prolapse are the most common source of sciatica (i.e. pain radiating below the knee) estimates of the annual prevalence range from 3% to 14%. Surgery can provide immediate relief of symptoms, however research has shown that functional outcomes of lower risk, non-operative treatments are equal to those following lumbar disc surgery, although recovery takes longer. For patients with a herniated disc and persistent disabling radicular pain, therapeutic epidural injections are an increasingly popular treatment option, aimed at diminishing pain, improving function and preventing surgery. [16]

Authors have reviewed that traditional wide laminectomy produced increased morbidity compared to less extensive procedures like inter-laminar fenestration[17]. The end point of assessment of any therapeutic modality is functional outcome, because that is what matters to the patients. Lumbar disc disease is a benign condition and pain is predominant factor limiting the activities of the patient, it is expected that after the therapy, the patient should have good functional outcome and go back to premorbid state. However, the fact is that the good outcome varies from 49-90% in different studies. [18]

Legrand et al [19] on their study on whether medical treatment or surgery should be done for Sciatica from disk herniation, evaluated 3 clinical trials. The first trial After 1 year, the outcome was favourable in 91% of patients treated surgically compared to only 61% of those treated medically. The difference was no longer statistically significant after 4 years and 10 years. The second trial called as SPORT inferred that patients who underwent surgery despite assignment to the medical-treatment group had significantly lower incomes and significantly worse pain and disability; in addition, at inclusion in the study they were more likely to report a belief that their condition would worsen over time. The third trial mentioned the faster effect of surgery was not associated with any of the studied baseline factors, including age, occupation, sex, angle of the



straight leg-raising test, baseline pain level, whether the herniation was excluded, level of the prolapse, or patient preference for surgery.

The outcome studies of lumbar disc surgery document a success rate between 38-99% according to used evaluation criteria. In literature, there are no common criteria. In measuring the outcome in the objective assessment of the results of lumbar disc surgery. Interestingly the results of lumbar disc disease presents a challenge to surgeons.

### AGE INCIDENCE:

The present study included 19(38%) cases in age group of 46-50 years. Mean age was  $46.52 \pm 6.41$  years ranging from 36-59 years. Mean age in cases undergoing epidural steroid injection was  $46.28 \pm 6.36$  years and  $46.70 \pm 6.58$  in surgical group. A study by Buttermann et al [20] included cases with mean ages 41 years, 40 years, and 39 years old respectively for epidural steroid injection, discectomy and crossover group. These findings were lower as compared to present study. Another study by Gugliotta et al [21] included cases with mean ages of  $50.4 \pm 13.5$  and  $49.8 \pm 12.7$  years in epidural steroid injection and surgery group respectively which are closer to present study. Helvoirt et al [16] included cases of lumbar herniated disc surgery were assessed with a MDT protocol and their pain response classified as centralizing or peripheralizing. The mean age was  $45.5 \pm 13.7$ ,  $46.7 \pm 8.3$ ,  $49.8 \pm 10.5$ ,  $46.9 \pm 6.8$  years in Resolved, Centralizing, peripheralizing with Peripheralizing with less pain continuing pain groups.

Kennedy et al [19] in their study to determine if there was a major difference in effectiveness between particulate and non-particulate corticosteroids for acute radicular pain due to lumbar disc herniation. The mean age of cases was 35.9 years and 35.6 years in Dexamethasone and Triamcinolone group ranging from 19–51 years and 20–58 years respectively. Mittal et al [22] had cases of disc prolapse treated with laminectomy and discectomy having range 20 to 65 years with a mean age of 37.55 years at the time of surgery. Tuck et al [24] included patients who underwent a PLIF procedure with minimally-invasive implantation of the VariLift®-L interbody fusion system (Wenzel Spine, Austin, TX USA). The mean age was 57.2 years ranging from 33.0–83.0 years.

### GENDER:

The present study included 40% males and 60 % females. 44% males and 56% females were included in epidural steroid injection group. 36 % males and 64% females were included in surgery group. Following table shows comparison of gender with various similar studies: Table no: 24 Comparison of gender with various similar studies

Study	ESI		Surgery	
	Males	Females	Males	Females
Gugliotta et al [91]	56.6	43.7	58.9	41.1
Helvoirt et al [86]	54.5	45.5	--	--
Kennedy et al [92]	65.9	34.1	--	--
Mittal et al [93]	--	--	80	20
Tuck et al [94]			48	52
Valat et al [95]	60	40	--	--
<b>Present study</b>	<b>44</b>	<b>56</b>	<b>36</b>	<b>64</b>

### DIAGNOSIS AT PRESENTATION:

The present study had majority cases of prolapse IVD L4-L5 i.e. 68% and 12 % had prolapse L5-S1. Similar studies like Buttermann et al [10] in their study on 169 patients with a large herniation of the lumbar nucleus pulposus had disc herniations that occurred at the L4 or L5 level except in 5 cases which is consistent with present study. Carette et al [16] in their study on 158 patients with sciatica randomly assigned to receive epidural methylprednisolone or placebo had 48.7 % cases having lesion at L4-L5 followed by L5-S1. Kennedy et al [12] in their study on 78 subjects which were enrolled and randomized into two groups, with 41 subjects receiving dexamethasone and 37 subjects receiving triamcinolone, majority i.e. 56.1% were having lesions at L5-S1. Valat et al [15] in their study on 85 patients with sciatica randomly assigned to receive placebo (control) or epidural corticosteroids (steroids), maximum (63%) lesion in cases receiving steroids

### **DURATION OF PAIN:**

In present study, 76% of subjects had duration of pain between 2 to 6 months. Similar studies like Peul et al [5] in their study on multicenter, prospective, randomized trial among patients with severe sciatica to determine whether a strategy of early surgery leads to better outcomes during the first year than does a strategy of conservative treatment had cases of 2 to 4 months duration of severe sciatica which is comparable to present study. Carette et al [16] in their study had cases receiving ESI and complaining of lower leg pain since 3 months. Kennedy et al [19] had cases undergoing treatment with ESI showing duration of pain since 2 to 3 months. Valat et al [20] had cases undergoing treatment with ESI showing duration of pain since 40 days.

### **CONCLUSION**

Pre-treatment imaging is an essential tool for confirmation and planning of the treatment modality, which must always be correlated with clinical findings. L4-L5 disc prolapse appeared to be the commonest presentation in terms of disc lesions. Rate of complication was higher in those treated by epidural steroid injection, however it was milder in nature and did not affect the duration of hospital stay. The rate of complication appeared to be lower in the surgical group, however a prolonged need of hospitalization was warranted following an occurrence of a complication. Patients belonging to both the groups had a significant improvement functionally post-intervention as inferred by the ODI. However, the follow-up at 6 months and 12 months did not demonstrate any significant change in either groups. Thereby concluding that both modalities are acceptable as per this study.

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**Ethical approval:** The study was approved by the Institutional Ethics Committee

### **CONFLICT OF INTEREST**

The authors declare no conflict of interest.

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