Section: Orthopaedics

Original Research Article

A HOSPITAL BASED DESCRIPTIVE STUDY TO EVALUATE THE FUNCTIONAL OUTCOME OF EPIDURAL STEROID INJECTION IN TREATMENT OF CHRONIC LOW BACK ACHE WITH RADICULOPATHY

Sravya Teja Paleti[1], Rohit Inuganti[1], S V Gopala Krishna[2], C V Dasariah[3]

[1]Associate Professor, Department of Orthopaedics, Alluri Sita Rama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh, India.
[2]Assistant Professor. Department of Orthopaedics, Alluri Sita Rama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh, India.
[4]Professor and HOD, Department of Orthopaedics, Alluri Sita Rama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh, India.

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Corresponding Author:
Dr. S V Gopala Krishna,
Email: vanajagks@gmail.com

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Abstract

Background: Low back pain is one of the common complaints. Sciatica is the general term which refers to Radiating leg pain with or without low back pain. About 90% of the patients with sciatica recover naturally with conservative measures over a period of 1 year. To reduce this natural recovery time numerous authors advise local delivery of steroids and anesthetics near the affected nerve roots. **Materials and Methods:** 200 Patients were included in the study. This study was done at Alluri Sita Rama Raju Medical College, Eluru. Pateints were followed up for 1year. Details like, sex, age, occupation, level of physical activites, were talken into consederation while analyzing the results. Patients were assessed with Oswestry Disability Index at regular follow-ups. **Result:** Among 200 patients, majority of them were males and majority of them were between 41 to 50 years. The results of Oswestry Disability Index gradually decreased with time after the epidural steroid injection. **Conclusion:** There is significant improvement both statistically and clinically with epidural steroid injection in intervetebral disc prolapse patients.

INTRODUCTION

Low back pain is one of the most common reasons why patients seek medical help. Low back ache is so common that at least 80% of the population will get it at some point in their lives.[1]

Sciatica (Radiating leg pain with or without low back pain) affects as many as 40% of the total population of which only 4%-6% have clinically significance.[2] About 90% of the patients with sciatica recover naturally with conservative measures over a period of 1 year.[3] To reduce this natural recovery time numerous authors advise local delivery of steroids and anesthetics near the affected nerve roots.[4]

Inter vertebral disc prolapse (IVDP) seems to be the most common cause of lumbosacral radiculopathy but a few patients with features suggesting lumbosacral radiculopathy won't show any disc prolapse in MRI or CT scan, while some people with no symptoms show disc prolapse making it a paradox. This paradox led to thinking of alternate explanations that prolapsed intervertebral disc in itself is not sufficient to produce features of lumbosacral radiculopathy and there must be some local chemical contribution causing the insult on the nerve roots. As the technology advanced, the understanding of sciatica improved leading to an understanding that pathogenesis of sciatica was mediated by Inflammation, immunity, and mechanical compression.[5]

Multiple factors which were thought to influence the development of sciatica were studied like body habitus, sex, parity, age, genetic factors, occupation, and environmental factors. No relationship was found with sex and body mass index (BMI) in the development of sciatica, but an increase in BMI was associated with low back pain. Body height may be a risk factor but only in the age group of 50-64 yrs and parity of six or more is also found to be associated. Age was found to be a risk factor as sciatica is rare before 20 years, and the odds ratio increases by 1.4 for every 10 years increase in age up to 64. A genetic link also was established, first reported in juvenile population.[6] But later in multiple prospective and retrospective studies, it was discovered that the first-degree relatives of the patients undergoing lumbar disc surgery had increased incidence of sciatica.[7,8] Reported

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heritability was 20.8% in patients who reported sciatica and 10.6% for patients who got admitted to the hospital for sciatica.[9]

Recreational activities like walking and jogging were studied. Walking was found to increase the chances of getting sciatica in people who were pain-free and jogging was shown to have a dual effect. In people who didn't have a prior history of sciatica, jogging was found to be a negative predictor whereas, in people who had a history of sciatica, jogging increased the risk of recurrence.[10]

Occupations like carpenters and machine operators were shown to have a positive influence. Driving is also found to be positively associated with sciatica or lumbar disc herniation. While driving, the body is exposed to a vibration frequency of 4-5Hz which may coincide with the resonant frequency of the spine in a sitting position which will lead to a direct mechanical effect. Retired or part- time farmers were found to have a lower incidence.[10]

Sciatica and radicular pain can be considered synonymous Radicular pain is distinguished from nociception by the axons being stimulated along their course; their peripheral terminals are not the site of stimulation.

Axonal stimulation may occur as a result of:

1. Mechanical deformation of dorsal root ganglion
2. Mechanical stimulation of previously damaged nerve roots
3. Inflammation of a dorsal root ganglion and
4. Possibly ischaemic damage to the dorsal root ganglia

Phospholipase A2 which is a natural component of the intervertebral disc, triggers release of Arachidonic acid which is a precursor of Leukotrienes and prostaglandins causing inflammation of the nerve roots. A high level of Phospholipase A2 was found in the epidural space and prolapsed disc material.[11] Steroids are supposed to reduce the inflammatory response induced by chemical, immunologic and mechanical lesions.)Steroids can be used in sciatica patients when they don't respond to NSAIDs (Non-steroidal anti- inflammatory drugs) as steroids inhibit inflammation at a higher place in the cascade than the NSAIDs. Local delivery of steroids into the epidural space gives a concentrated dose which will cause an effect that lasts longer. So, in patients who don't respond to the conservative treatment and are not indicated for surgical treatment, epidural steroid injections can be given. Epidural steroid injections were being used as a treatment for sciatica since they were introduced around 60 years ago. Multiple studies were performed on this subject and still the results were controversial. So, this study is aimed to evaluate the functional outcome of epidural steroid injection in treatment of chronic low back ache with radiculopathy.

MATERIALS AND METHODS

After obtaining Institutional ethics committee approval, 200 patients who were given epidural steroid were studied over 1 year between June 2021 to June 2022. This study was done in Department orthopaedics in Alluri Sita Rama Raju Medical College in Eluru, in Andhra Pradesh. Sample size is calucalated by formula

$$n = \frac{(Z\alpha/2)^2 PQ}{L^2}$$

When calculated with P is the prevalence in this area as 70%, based on previous studies and Q as 30 %(100-P) and Zα/2 as 1.96 and L as 10% interval. The minimum sample size was 81, but during the study period 200 patients turned up. So, 200 patients were included in the study.

Patients between 25 years to 75 years, who were willing to be participate in study were included in the study. All of them had MRI proven prolapsed intervertebral disc (PIVD) or Lumbar canal stenosis (LCS) at single level and who were not satisfied with conservative treatment over 4 weeks. Patients who had undergone previous spine surgeries and who had multiple level Discs, patients in cauda equine syndrome and patients with coagulopathies were not included into the study.

The Oswestry Disability Index (ODI) scores were assessed pre-injection in the Outpatient department (OPD), the scores were repeated 24-48 hours, 1 month, 3 months, and 6 months after the injection was administered.[11]

Epidural steroid was given by postioning patient to sit with their legs on the side of the table resting on a stool. Anatomic levels of the interspinous spaces were identified with the help of the landmark, i.e., the iliac crest which is at the level of the L3-L4 space. Then, the desired level, i.e., one level above the affected level was worked up or down.

Once the desired level is identified, 5ml of local anaesthesia were given and with an 18G Tuohy needle with a Loss of resistance syringe, epidural space was identified with a loss of resistance technique with normal saline. Once the epidural space is reached, a premixed solution of 2ml of 80mg Methyl prednisolone and 0.25% Bupivacaine along with 6 ml normal saline is injected and the patient is made to lie down supine for 10minutes.

And patients were discharged after 4 hours of observation. Patients were contacted on phone and interviewed for ODI scores at regular intervals i.e., 24-48 hours, 1 month, 3 months, and 6 months after injection. Data was collected in the proforma made for the study and entered into epidata.

RESULTS

There were a total of 200 patients included in the study out of which 170 patients were having

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intervertebral disc prolapse (IVDP) and 30 patients were having lumbar canalstenosis.

Majority of patients were between 41 to 50 years (60), followed by between 20-30 years (50) (Figure 1]. And majority of patients were males (170, 85%), only 30(15%) patients were females.

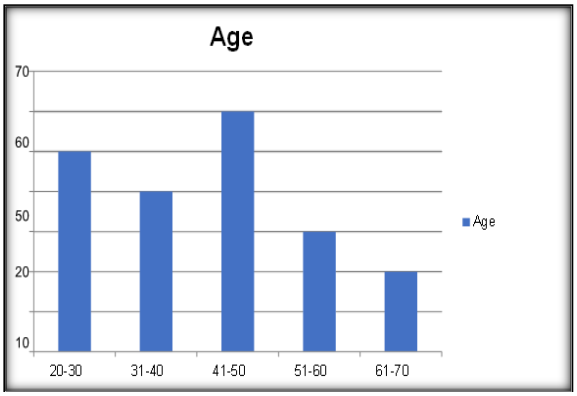

Figure 1: Age distribution of the study population

There were 40 patients with L3-L4 involvement; 120 patients with L4-L5 involvement; 40 patients with L5-S1 involvement.

The most common level of pathology in the study was in L4-L5 i.e. 60% of the total patients.

Patients were scored by Oswestry Disability Index at pre-injection, 24 hours, 1 month, 3 months, and 6 months post-injection, and the average values are as shown in the [Table 1].

50 patients (25%) had ODI scores of > 40 i.e., Severe Disability at the end of 6 months.

So in 50 patients (25%), the injection were not effective at the end of 6months.150 patients (75%) had a good outcome. [Figure 2]

In patients with Lumbar canal stenosis (LCS), 20 out of 30 patients had an ODI score > 40 at the end of 6 months i.e., 66% had a bad functional outcome [Figure 3].

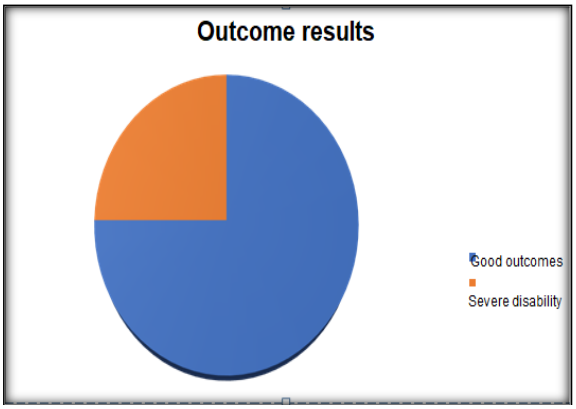

Figure 2: Outcome results

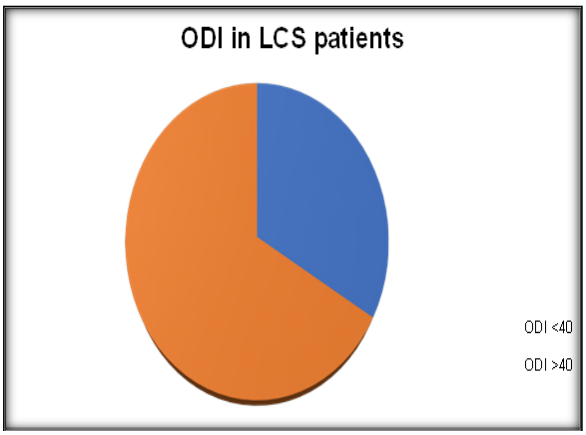

Figure 3: ODI in lumbar canal stenosis patients 6 months post-injection

Potential complications following an epidural steroid injection are infection, bleeding, nerve damage, dural puncture, hypotension, bradycardia, and local anaesthetic toxicity.

There were no significant complications in this study group except for minor complications like transient pain in 2 patients which was controlled with pain killers.

Table 1: Averages of ODI scores at regular intervals with standard deviation and statistical significance

Review	ODI Score (Mean)	Standard deviation	P value
Pre-injection	54.6	6.459	<0.01
24 hours, Post-injection	44.0	5.505	<0.01
1 month	27.6	6.210	<0.01
3 months	25.1	8.321	<0.01
6 months	29.6	12.558	<0.01

DISCUSSION

The global burden caused by low back pain and sciatica is enormous. The impact of low back pain is seen considerably on individuals, families, communities, and health care systems. Sciatica is caused by Mechanical compression as in intervertebral disc prolapse, lumbar canal stenosis, etc., and Inflammation causing chemical neuritis of the nerve roots and is also immune mediated. Treatment for most of the patients with sciatica is conservative i.e., Rest, Physical therapy, Medication (NSAIDs, Pregabalin, Gabapentin, etc), Short wave diathermy, etc. Patients who don't respond to conservative management need further treatment. Epidural steroid injections are considered the intermediate between conservative management and surgical management of sciatica. The pathogenesis of Sciatica as described above is by inflammation, immunity, and mechanical compression. Steroids are also known to powerful immune modulators that are implicated in the pathogenesis of sciatica. Steroids also act by inhibiting aggregation of Leukocytes, preventing degranulation of granulocytes, macrophages, and mast cells; stabilization of lysosomal membranes. They also

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inhibit the synthesis and release of pro-inflammatory substances like PLA2, Arachidonic acid, IL-1, PG-E2, TNF-α. In a prospective, double-blinded randomized controlled study conducted by Breivik and colleagues, they studied 35 patients with low back pain and sciatica who were not responding to the conservative management for a significant amount of time. They studied the outcomes with epidural steroid injections and found that there was a good outcome in 65% of patients so they could return to work early.[12] In the prospective, randomized controlled study conducted by Ridley et al, they observed a statistically significant improvement in 65% of patients who received epidural steroid injection.[13] In the study we conducted, which is a prospective cohort study, there were 200 included in study and There were 75% of patients who had good functional outcomes at the end of 6 months after injection was given. Results of our study were in support of the above studies. In a prospective, double-blinded randomized control study conducted by Valat, Rozenberg et al, they concluded that the epidural steroid injections provide no additional benefit.[14] In the meta-analysis conducted by Kuan Liu et al, they concluded that epidural steroid injections were not giving a statistically significant improvement in symptoms of ability to walk in patients with lumbar canal stenosis.[15] In the lumbar canal stenosis group, 20 out of 30 patients had bad functional outcomes at the end of 6 months i.e., 66.66% had a bad functional outcome after giving epidural steroid injection in our study also.

CONCLUSION

The present study concludes that there is a significant functional improvement both statistically and clinically in patients with intervertebral prolapse after an epidural steroid injection. The outcomes in lumbar canal stenosis were not satisfactory, but as the study population of lumbar canal stenosis is too small we need further studies to emphasis this conclusionCollege Hospital & Research Centre, Indore, India.

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