Outcomes of Epidural Steroid Injections as a Conservative Treatment for Lumbar Spinal Stenosis

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Abstract

Background: Lumbar spinal stenosis (LSS) is a degenerative condition characterized by the narrowing of the spinal canal in the lower back, resulting in debilitating symptoms. While surgery is often considered for severe cases, alternative conservative treatments are sought for managing mild to moderate LSS. Epidural steroid injections (ESIs) have emerged as a non-surgical option to improve pain and functional outcomes. **Objective:** This aims to study the outcomes of rehabilitation approaches, specifically focusing on the use of ESIs as a conservative treatment for LSS. **Methods:** A prospective study was performed in the Department of Physical Medicine & Rehabilitation, Rajshahi Medical College Hospital, Bangladesh. A total of 33 patients diagnosed with lumbar spinal stenosis (LSS) were randomly assigned in to three groups. Group 1 (n = 13) underwent a 2-week inpatient physical therapy program, group 2 (n = 10) received epidural steroid injections, and group 3 (n = 10) served as the control group. The efficacy and safety of ESIs in LSS management. pain and functional assessment scores, such as the Roland Morris Disability Index (RMDI) and the Nottingham Health Profile (NHP) physical activity subscore, were applied to evaluate the outcomes of the interventions at the end of 2nd week, 1 month, 3 months, and 6 months of the follow up compering with the control group (group 3, without any intervention) **Results:** At the end of the 2nd week, both the epidural steroid and physical therapy groups exhibited notable improvements in pain and functional parameters, with no significant difference observed between the two treatment groups. Additionally, the control group also showed significant improvements. **Conclusion:** Epidural steroid injections and physical therapy both seem to be effective in LSS patients up to 6 months of follow-up. It provides short-term pain relief and functional improvement. While the long-term efficacy remains uncertain, ESIs can be a valuable component of a comprehensive rehabilitation approach for managing LSS. Careful patient selection, optimal dosing, and close monitoring are essential to maximize the benefits and minimize the risks associated with ESIs. Further research is warranted to clarify the long-term outcomes and refine the utilization of ESIs in the conservative management of lumbar spinal stenosis.

Key words: rehabilitation; radiculopathy; epidural Injections; spinal Stenosis

Introduction

Lumbar spinal stenosis (LSS) is a common degenerative condition characterized by the narrowing of the spinal canal, leading to compression of nerves and subsequent pain and functional limitations.[1] Conservative treatments, such as rehabilitation approaches, play a crucial role in managing LSS. One such approach is epidural steroid injections (ESIs), which involve the administration of corticosteroids into the epidural space to reduce inflammation and alleviate symptoms.[2] This introduction aims to explore the outcomes of using ESIs as a conservative treatment for LSS. By examining the effectiveness and potential benefits of ESIs, this study seeks to provide valuable insights into the role of these injections in the management of LSS and its impact on patient outcomes.[3]

The condition arises from various degenerative changes in the spine, such as facet joint and ligamentum flavum hypertrophy, disc degeneration, spondylolisthesis, and scoliosis. The typical onset of symptoms occurs after the age of 50 years, with neurogenic claudication being a major complaint. Neurological symptoms arise due to the compression or ischemia of the cauda equina or spinal nerves caused by the stenosis. Additional symptoms include low back pain, as well as pain, numbness, and weakness in the lower limbs.[4] The presentation of symptoms may vary with different postural changes, where extension exacerbates foraminal narrowing, while flexion provides relief. Diagnosing LSS primarily relies on patient history and clinical examination, although imaging techniques can provide valuable information regarding the severity and location of the stenosis.[5]

Initial management of LSS involves patient education, pain management, exercise, and physical therapy to preserve or enhance daily activities. Surgical intervention may be considered for patients who do not experience improvement with conservative treatments.

Methods

In this prospective study conducted at the Department of Physical Medicine & Rehabilitation, Rajshahi Medical College Hospital in Bangladesh, the efficacy and safety of epidural steroid injections (ESIs) in managing lumbar spinal stenosis (LSS) were assessed. A total of 33 patients diagnosed with lumbar spinal stenosis (LSS) based on medical history, and physical and neurological examination attended at the department were randomly assigned in to three groups. Group 1 (n = 13) underwent a 2-week inpatient physical therapy program, group 2 (n = 10) received epidural steroid injections, and group 3 (n = 10) served as the control group. The primary objective of the study was to evaluate the effectiveness of ESIs in the management of LSS. Pain and functional assessment scores, specifically the Roland Morris Disability Index (RMDI) and the Nottingham Health Profile (NHP) physical activity subscore, were measured for the evaluation of the effectiveness at the end of 2nd week, 1 month, 3 months, and 6 months of the study.

Patients with a history of coronary artery disease, peripheral artery disease, spinal surgery, recent vertebral fracture, progressive neurological deficit, or cauda equina syndrome were excluded from the study. The patient's age, sex, and duration of symptoms were recorded. Measurements of the anteroposterior, transverse, and lateral diameters of the spinal canal were taken at the narrowest level of the radiographic stenosis and were defined as an anteroposterior diameter <12 mm or transverse diameter <15 mm. All patients included in the

study were instructed to follow a home-based therapeutic exercise program for 6 months. The program consisted of stretching exercises for the hip flexors, hamstrings, and lumbar paraspinal muscles, as well as strengthening exercises for the abdominal and gluteal muscles.

These exercises were to be performed twice daily. Additionally, all patients were given oral diclofenac sodium 75 mg, which was administered twice daily for 2 weeks.

This follow up study initially included 33 patients with their informed consent but during the follow-up period (6 months), 3 patients from group 1 and 1 patient from group 3 were dropped out. Thus the data analysis was performed on the finally remaining 29 patients (21 women and 8 men).

Data were analysed in the computer using SPSS for windows. Descriptive analytical techniques involving frequency distribution, mean with standard deviation, and range to summarize the characteristics of the study population, including age, sex, symptom duration, and baseline assessment scores were applied. T-test or Mann-Whitney U test for continuous variables (e.g., pain scores), and chi-square or Fisher's exact test for categorical variables (e.g., treatment groups) were applied to determine the significance of the observed differences between the groups. To assess the changes in pain and functional assessment scores over time, repeated measures analysis (such as repeated measures ANOVA or mixed-effects models) were done to compare the scores within and between treatment groups across different time points (baseline, 2 weeks, 1 month, 3 months, and 6 months).

Results

A total of 29 patients, 21 were females and 8 were male with a mean age of 59.1 ± 10.8 years and a mean symptom duration of 5.4 ± 5.6 years. There were no significant differences noted between the study groups at the baseline. In group 1, significant improvements were observed in pain (measured using the Visual Analog Scale), weight carrying test, and Roland Morris Disability Index (RMDI) at all follow-up visits. The treadmill walk test (TFS) showed improvement at 6 months, and the sit-to-stand test demonstrated improvement at 1 month and 3 months. In group 2, significant improvements were observed in pain, TFS, and RMDI at all follow-up visits. Additionally, finger floor distance (FFD) improved at 2 weeks and 3 months, timed agility test (TAT) improved at 3 months, and weight carrying test improved at 2 weeks. In group 3, significant improvements were observed in TFS and RMDI at all follow-up visits, pain at 1 month, and TAT at 1, 3, and 6 months.

Comparing the percent changes in the parameters mentioned above between the three groups, no statistically significant differences were found except for pain intensity (VAS). Group 2 showed significantly greater improvement in pain intensity compared to Group 3 at the 2-week follow-up. RMDI scores significantly improved in all three groups at all follow-up visits, and the analysis between groups revealed that group 2 had significantly higher improvement compared to group 3 at the 2-week follow-up.

Table I: Distribution of Patients According to Age, Sex, and Symptom Duration

	Group 1	Group 2	Group 3	P
Sex				
Male (n)	5	8	8	NS*
Female (n)	5	2	1	NS*
Age (mean ± SD)	62.6 ± 12.5	61.1 ± 9.8	53.1 ± 8.3	NS†
Symptom duration (mean ± SD)	5.7 ± 4.6	5.0 ± 7.4	5.7 ± 4.9	NS‡

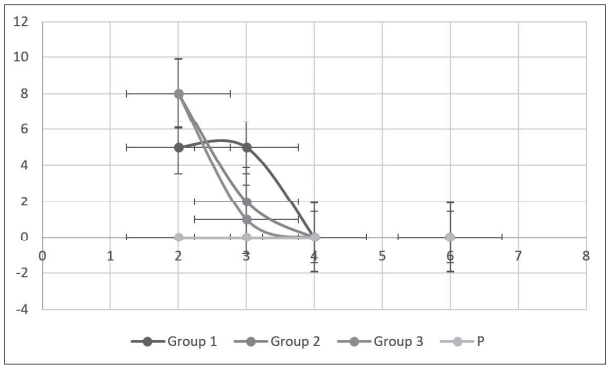

Fig I. Patient Distribution by Age, Sex

Table II: Changes in NHP Subgroup Scores (Median) in the Study Groups During Follow-up

Subgroup	Group	Baseline	2 wk	1 mo	3 mo	6 mo
Pain (VAS)	1	54.1	19.4*	31.2†	18.2*	23.2†
	2	56.3	7.3*	36.2†	20.5†	23.0†
	3	58.6	33.0	20.1	27.7	20.1
Physical mobility	1	41.8	31.2†	37.2	32.5	37.1
	2	41.8	21.9*	31.9†	31.2†	31.2
	3	41.8	31.2	20.5	31.0	20.5
Energy	1	88.0	30.4	24.0	30.4†	48.8
	2	100	60.8†	100	62.0	81.6
	3	63.2	63.2	60.8	100	63.2
Sleep	1	55.9	31.8	12.5†	12.5	12.5
	2	58.0	26.2	44.7	14.3	25.5
	3	55.9	12.5	12.5†	28.6	28.6
Social isolation	1	28.9	18.0	18.9	11.0	0
	2	41.7	22.0	22.0	32.0	32.3
	3	0	0	0	0	0
Emotional reactions	1	33.0	17.1†	15.1†	0†	6.9
	2	45.0	13.3†	46.1	41.4	27.5
	3	23.7	0	9.7	9.7	0

*P < 0.01 †P < 0.05 (Wilcoxon test)

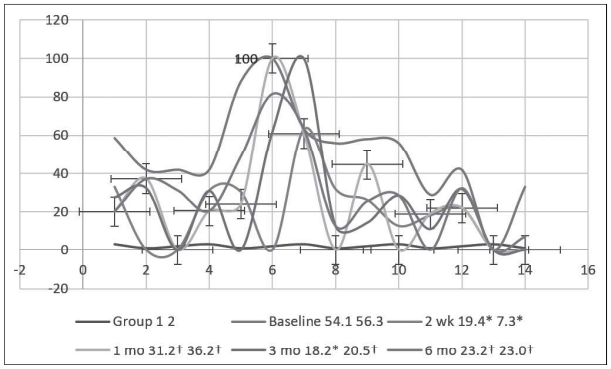

Fig II . Changes in Study Groups' Median NHP Subgroup Scores During Follow-Up

Discussion

The outcomes of the rehabilitation approaches, including epidural steroid injections (ESIs), as a conservative treatment for lumbar spinal stenosis (LSS) were examined in this study. The results demonstrated significant improvements in pain and functional parameters in both the ESI group and the physical therapy group. Interestingly, there was no significant difference between these two treatment groups, suggesting comparable efficacy. The control group also showed significant improvements, indicating that conservative approaches, including exercise and diclofenac administration, can be beneficial in managing LSS. Overall, these findings support the effectiveness of ESIs and rehabilitation approaches in the conservative treatment of LSS .[6]

The majority of studies on lumbar spinal stenosis (LSS) have primarily focused on comparing surgical and nonsurgical treatment methods. While surgical treatment has shown more favourable outcomes in some studies, initial conservative treatment is generally recommended, especially for patients with mild to moderate symptoms of LSS. Currently, there is limited evidence regarding the effectiveness of epidural steroid injections (ESIs) in treating LSS, and it appears that patients with disc

herniations may benefit more from steroid injections than those with LSS. Some studies comparing steroids and local anaesthetics have found no additional benefit from steroids.[7] Despite the inconclusive evidence, ESIs are suggested as a reasonable treatment option for LSS patients, with 23% of all epidural steroid injections being performed for LSS treatment. Consistent with previous reports, our study demonstrates significant improvements in pain and functional parameters in the group receiving epidural steroid injections, particularly during the early phase of treatment. There are only a limited number of studies investigating the effectiveness of physical therapy in LSS treatment, and the wide range of physical therapy methods employed makes it challenging to compare their results. One prospective study reported the effectiveness of a conservative treatment program involving physical therapy, infrared heating, ultrasonic diathermy, exercise, and calcitonin on 145 LSS patients, showing positive effects on pain, clinical examination, and neurogenic claudication. Another recent study treated LSS patients over 70 years old with in-patient conservative treatment, including in-bed pelvic traction, body casts, and epidural steroid injections, resulting in significant improvement across four domains after two weeks .[8] However, a study focusing on LSS patients over 65 years old reported the failure of conservative treatment, despite incorporating ultrasound waves, short waves, flexion exercises, and optional epidural or nerve root injections. In a randomized controlled trial, two conservative treatment options were compared, showing significant improvement in both groups, with additional gains observed in the group receiving manual physical therapy, body weight-supported treadmill walking, and exercise. Consistent with most previous reports, our study's follow-up results demonstrate significant improvement in pain and functional parameters in the physical therapy group, but the diversity of physical therapy interventions limits direct comparisons. Apart from studies assessing the effects of conservative treatment on LSS, our study is the first randomized controlled trial to compare the efficacy of epidural steroid injections with physical therapy or exercise, aiming to determine which approach is more beneficial .[9]

Conclusion

The outcomes of our study support the use of epidural steroid injections as a conservative treatment approach for lumbar spinal stenosis (LSS). We found significant improvements in pain and functional parameters in patients who received epidural steroid injections. However, the magnitude of improvement was more pronounced in the early phase of treatment, suggesting that epidural steroid injections may have a greater short-term benefit. While the evidence for the efficacy of epidural steroid injections in LSS is still limited, our study adds to the growing body of research supporting their use as a reasonable treatment option. Further studies are needed to explore the long-term effectiveness and comparative efficacy of epidural steroid injections in the management of LSS.

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