

ORIGINAL ARTICLE

Effect of Intraoperative Epidural Steroids to Prevent Post-op Pain and Length of Hospital Stay in Patients undergoing Lumbar Discectomy Presenting in Department of Neurosurgery at Bolan Medical College

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ABSTRACT

Introduction: Approximately 80% of individuals experience at least one episode of low back pain in their lifetime. Due to its widespread occurrence and considerable impact on disability, low back pain results in annual expenses surpassing \$100 billion in the United States.^{1,2} Among the extensive differential diagnoses for low back pain, the primary cause is often attributed to intervertebral degeneration, which results in degenerative disc disease and lumbar disc herniation.²

Objective: To compare effect of intraoperative use of epidural steroids with normal saline in lumbar discectomy in terms of post-operative pain and length of hospital stay

Setting: Neurosurgery Department, Bolan Medical College/ teaching Hospital, Quetta

Duration of Study: From 17th April 2022 to 16th April 2023.

Study Design: Randomized Controlled Trial

Material and Methods: In this study, a total of 120 patients were examined, with 60 individuals assigned to each group. The patients were randomly allocated into two groups through blocked randomization, each comprising 60 participants. Group A received intraoperative epidural methylprednisolone acetate, while Group B was administered only normal saline. The effectiveness of the treatment was assessed from the day of surgery until the patient's discharge, utilizing the Visual Analog Scale (VAS) for pain measurement and evaluating the total duration of hospital stay

Results: Our study shows that mean age in Group A mean age was 44 years with SD \pm 12.77. Whereas mean age in Group B mean age was 46 years with SD \pm 13.12. In Group A 34 (57%) patients were male and 26 (43%) patients were female. Whereas in Group B 36 (60%) patients were male and 24 (40%) patients were female. More over Group A (epidural steroids) was effective in 56 (93%) patients while Group B (normal saline) was effective in 40 (67%) patients.

Conclusion: Our study concludes that epidural steroids are more effective than normal saline after lumbar discectomy in term of post-operative pain and hospital stay.

Keywords: Effectiveness, intraoperative use of epidural steroids, normal saline, discectomy, lumbar disc herniation

INTRODUCTION

Approximately 80% of individuals experience at least one episode of low back pain in their lifetime. Due to its widespread occurrence and considerable impact on disability, low back pain results in annual expenses surpassing \$100 billion in the United States.^{1,2} Within the immense differential diagnosis of low back pain, the most common source being the intervertebral degeneration leading to degenerative disc disease and lumbar disc herniation.² Low back pain and radicular pain are most frequent presentations following disc herniation in the hospital out-patient department.³ Lumbar disc herniation can lead to debilitating pain and discomfort to the patient.² Magnetic resonance imaging (MRI) is the gold standard for imaging to confirm suspected herniated lumbar disc with a diagnostic accuracy rate of 97%.^{4,5} Although 90% of patients recover with conservative management, rest of them need surgical intervention.⁶ Laminectomy and discectomy are the most common procedures in the management of symptomatic lumbar disc herniation.⁷ The surgical treatment of choice for acute disc herniation without spondylolisthesis is lumbar discectomy.⁸

Among the extensive differential diagnoses for low back pain, intervertebral degeneration is the most prevalent cause, resulting in degenerative disc disease and lumbar disc herniation.²

In outpatient settings, low back pain and radicular pain are the most common symptoms observed following disc herniation. Lumbar disc herniation can cause significant pain and discomfort for patients. Magnetic resonance imaging (MRI) is considered the gold standard for confirming a suspected herniated lumbar disc, boasting a diagnostic accuracy of 97%.^{4,5}

While 90% of patients experience recovery through

conservative treatment, the remaining individuals may require surgical intervention.⁶ Laminectomy and discectomy are the primary surgical procedures employed in the treatment of symptomatic lumbar disc herniation.⁷ For acute disc herniation without spondylolisthesis, lumbar discectomy is the preferred surgical approach.⁸

Lumbar discectomy for herniated nucleus pulposus ranks among the most frequently performed spinal procedures.⁹ The primary objective of this intervention is to alleviate pain; however, many patients experience significant discomfort following the discectomy.¹⁰

Despite substantial advancements in both clinical and fundamental understanding of pain transmission and modulation, a considerable number of postoperative pain cases remain inadequately managed.¹¹

Uncontrolled acute postoperative pain can hinder mobility and daily activities, extend hospital stays, and alter patients' perceptions of their recovery timeline post-surgery. Inadequately managed acute postoperative pain is linked to increased morbidity, diminished functional capacity and quality of life, prolonged recovery periods, extended reliance on opioids, elevated healthcare expenses, and a heightened risk of developing chronic pain.¹²

MATERIAL AND METHODS

The study was conducted at the Department of Neurosurgery, Bolan Medical College/ Teaching Hospital, Quetta during the period from 17th April 2022 to 16th April 2023. In Randomized Controlled Trial, a total of 120 patients were examined, with 60 individuals assigned to each group.

Data Collection Procedure: The study was started after taking approval from hospital ethics committee. Informed written consent

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was obtained from each patient who met the inclusion criteria and agreed to participate, utilizing a consecutive non-probability sampling method. The patients were randomly assigned to two groups through blocked randomization, with each group comprising 60 patients. Group A received intraoperative epidural methylprednisolone acetate, while Group B was administered only normal saline. Basic demographic data, including name, age, and gender, were recorded on a pre-designed form. The efficacy of the treatment was assessed from the day of surgery until the patient's discharge, using the Visual Analog Scale (VAS) for pain and measuring the total length of hospital stay.

The data was input into SPSS version 20. Descriptive statistics were employed to determine the means \pm standard deviation for the patients' ages. Frequencies and percentages were calculated for gender and treatment effectiveness. A chi-square test was conducted to compare the treatment efficacy between the two groups, with a significance level set at a p-value of less than 0.05. Effect modifiers, such as age and gender, were managed using a stratification approach, followed by the application of a post-stratification chi-square test.

RESULTS

In this study age distribution among two groups was analyzed as in Group A 12 (40%) patients were in age range 31-40 years, 14 (47%) patients were in age range 41-50 years and 4 (13%) patients were in age range 51-60 years. Mean age was 44 years with SD \pm 12.77. Where as in Group B 11 (37%) patients were in age range 31-40 years, 14 (47%) patients were in age range 41-50 years and 10 (16%) patients were in age range 51-60 years. Mean age was 46 years with SD \pm 13.12. (Table no 1) Gender distribution among two groups was analyzed as in Group A 35 (57%) patients were male and 26 (43%) patients were female. Where as in Group B 36 (60%) patients were male and 24 (40%) patients were female (table no 1) Efficacy among two groups was analyzed as Group A was effective in 56 (93%) patients and was not effective in 4 (7%) patients. Whereas Group B was effective in 40 (67%) patients and was not effective in 20 (33%) patients. (Table no 1) Stratification of efficacy with respect to age and gender is mentioned in table no 2.

Table 1: Age Distribution, Gender, Efficacy

	Group A	Group B	P-Value
Age			
31-40 years	24 (40%)	22 (37%)	0.2210
41-50 years	28 (47%)	28 (47%)	
51-60 years	8 (13%)	10 (16%)	
Total	60(100%)	60 (100%)	
Mean and SD	44 year \pm 12.77	46 year \pm 13.12	
Gender			
Male	34 (57%)	36 (60%)	0.6110
Female	26 (43%)	24 (40%)	
Efficacy			
Effective	56 (93%)	40 (67%)	0.0064
Not effective	4 (7%)	20 (33%)	

Table 2: Stratification of Efficacy W.R.T Age and Gender Distribution

	Efficacy	Group A	Group B	P-Value
31-40 years	Effective	22	14	0.0300
	Not effective	2	8	
41-50 years	Effective	26	18	0.0321
	Not effective	2	10	
51-60 years	Effective	8	8	0.1252
	Not effective	0	2	

DISCUSSION

Nearly 80% of the population sustains an episode of low back pain once during their lifetime.¹ Due to its high prevalence and significant contribution to disability, Low Back Pain incurs an annual cost exceeding \$100 billion in the United States Of America.^{1,2} Within the immense differential diagnosis of low back pain, the most common source being the intervertebral

degeneration leading to degenerative disc disease and lumbar disc herniation.² Low back pain and radicular pain are most frequent presentations following disc herniation in the hospital out-patient department.³ Lumbar disc herniation can lead to debilitating pain and discomfort to the patient.² Magnetic resonance imaging (MRI) is the gold standard for imaging to confirm suspected herniated lumbar disc with a diagnostic accuracy rate of 97%.^{4,5} Although 90% of patients recover with conservative management, rest of them need surgical intervention.⁶ Laminectomy and discectomy are the most common procedures in the management of symptomatic lumbar disc herniation.⁷ The surgical treatment of choice for acute disc herniation without spondylolisthesis is lumbar discectomy.⁸ Our study shows that mean age in Group A mean age was 44 years with SD \pm 12.77. Whereas mean age in Group B mean age was 46 years with SD \pm 13.12. In Group A 34 (57%) patients were male and 26 (43%) patients were female. Where as in Group B 36 (60%) patients were male and 24 (40%) patients were female. More over Group A (epidural steroids) was effective in 56 (93%) patients while Group B (normal saline) was effective in 40 (67%) patients. Similar results were observed in another conducted by Annan Hu et al in which there are 60 patients in epidural steroid group, intravenous steroid group, and control group, respectively. Visual analog scores (VAS) and the Oswestry Disability Index (ODI) were collected. Successful pain control is defined as 50% or more reduction in back and leg pain (VAS scores). VAS scores (back and leg) and ODI showed a significant decrease in all groups when comparing pre- and postoperatively.¹³

The group receiving epidural steroids demonstrated a notable enhancement in effective pain management compared to the control group at the two-week follow-up. The Visual Analog Scale (VAS) scores for leg pain in the epidural steroid group exhibited a significant reduction when compared to the intravenous steroid group at one, three, and seven days post-surgery; however, this difference was not statistically significant at the one, six, and twelve-month follow-ups. No significant differences in the Oswestry Disability Index (ODI) were observed among all groups at the one, six, and twelve-month follow-ups. The use of epidural steroids appears to be more effective for short-term postoperative pain relief following percutaneous endoscopic lumbar discectomy (PELD). Additionally, the epidural administration of steroids did not indicate any increased risk of infection. Similar findings were reported in a study conducted by Iversen R et al., which required power calculations for the inclusion of 41 patients in each group.¹⁴

We did not allocate 17 of 133 eligible patients because their symptoms improved before randomisation. All groups improved after the interventions, but we found no statistical or clinical differences between the groups over time. For the sham group (n=40), estimated change in the Oswestry disability index from the adjusted baseline value was -4.7 (95% confidence intervals -0.6 to -8.8) at 6 weeks, -11.4 (-6.3 to -14.5) at 12 weeks, and -14.3 (-10.0 to -18.7) at 52 weeks. For the epidural saline intervention group (n=39) compared with the sham group, differences in primary outcome were -0.5 (-6.3 to 5.4) at 6 weeks, 1.4 (-4.5 to 7.2) at 12 weeks, and -1.9 (-8.0 to 4.3) at 52 weeks; for the epidural steroid group (n=37), corresponding differences were -2.9 (-8.7 to 3.0), 4.0 (-1.9 to 9.9), and 1.9 (-4.2 to 8.0). Analysis adjusted for duration of leg pain, back pain, and sick leave did not change this trend. Similar results were observed in another conducted by Laiq N et al in which a total number of 52 patients who fulfilled the inclusion criteria were studied.¹⁵ Out of them, 2 patients – one in each group, were lost to follow-up and were excluded from the study. The male to female ratio was 17:8 and 15:10, the mean age was 40 \pm 2.15 and 41 \pm 2.45 years and mean weight of 75 \pm 6.55 and 78 \pm 7.45 kg was found in the steroid group and conservative group respectively. There was no significant statistical difference with respect to age (p=0.1316) and weight (p=0.137) in the two groups. A notable enhancement in both pain scores and patient satisfaction was observed in the steroid group. In contrast, the conservative group exhibited a less pronounced improvement during the initial timeframe of two weeks

and one month (p-value 0.05). Epidural steroid injections are regarded as a more effective alternative for managing acute sciatica symptoms compared to conservative treatment methods.

CONCLUSION

Our study concludes that epidural steroids are more effective than normal saline after lumbar discectomy in term of post-operative pain and hospital stay.

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