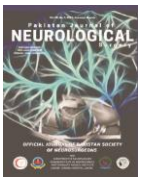

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Original Article (SPINE)

Outcome of Topical Epidural Methylprednisolone Versus Control in Lumbar Disc Surgery Patients

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ABSTRACT

Objective: The use of topical intraoperative methylprednisolone in lumbar disc surgery leads to significant improvement in pain relief and early resumption of daily life activities. The study determined the outcome of topical epidural methylprednisolone.

Materials & Methods: 60 patients included with diagnosed cases of the herniated lumbar disc with ASA Grade 2 and below. Group A was for patients who had to receive topical methylprednisolone while group B was the control group where no topical methylprednisolone had been used. The outcome was measured from OLBI and VAS scores.

Results: In Group A, the mean hospital stay was 2 days, mean OLBI score was 35%, mean VAS score was 3, mean time to resumption of ADL was 7 days, mean dose of paracetamol (per day) was 3 mg, mean dose of Ketorolac (per day) was 90 mg. Whereas Group B, mean hospital stay was 3 days, mean OLBI score was 45%, mean VAS score was 5, mean time to resumption of ADL was 10 days, mean dose of paracetamol (per day) was 4 mg, mean dose of Ketorolac (per day) was 100 mg. In Group A, 91% of patients had a favorable outcome and 9% of patients had an unfavorable outcome. Whereas in Group B, 83% of patients had a favorable outcome and 15%of patients had an unfavorable outcome. There existed insignificant results in outcomes concerning diabetic/non-diabetic, and hypertension/non-hypertension.

Conclusion: The use of topical intraoperative methylprednisolone in lumbar disc surgery leads to significant improvement in pain relief and early resumption of daily life activities as compared to without the use of topical methylprednisolone.

Keywords: Outcome, Epidural Methylprednisolone, Lumbar Disc Surgery, OLBI (Oldenburg Burnout Inventory), ADL (Activities Of Daily Life).

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INTRODUCTION

Low backache is a highly common disorder with a lifetime prevalence of up to 80%. Two to five percent of patients presenting with radiculopathy are due to lumbar disc herniation. Among these patients between 10% to 20% will eventually undergo surgery. The commonly used approaches for lumbar disc herniation include trans-canal procedures such as microdiscectomy, laminectomy, and endoscopic discectomy. Studies have reported a favorable outcome of 60 – 80%. Common complications of lumbar disc surgery are wound infection, cerebrospinal fluid leak, and persistent pain leading to the failed back syndrome. Failed back syndrome affects the early resumption of activities of daily living, increased analgesia requirement, and repeat surgical procedures. Different strategies have been used to decrease postoperative pain. Perioperative use of corticosteroids and bupivacaine is reported to be effective in reducing pain and decreasing analgesic requirements without complications. Local or systemic steroids of different types are present in the literature. The use of anesthetic agent infiltration before incision or closing wound is another way to decrease postoperative pain and early mobilization. All these modalities aim to reduce postoperative pain, early mobilization, and resumption of daily life activities.[1-5]

Methylprednisolone topical use has been previously identified for pain relief and decreased hospital stay duration. However, they suggested a larger series is needed to evaluate the use of topical use of methylprednisolone. Based on these recommendations by previous studies, a comparative effectiveness study regarding the use of topical methylprednisolone will answer two very important questions, whether topical methylprednisolone use in lumbar disc surgery will improve pain relief by the reduced requirement for postoperative analgesia and two whether it will reduce the time for resumption of activities of daily life activities.[1-5] Since the evidence regarding the use of topical epidural methylprednisolone in lumbar disc surgery is still developing, it will be pertinent to conduct a randomized study that may answer whether the use of topical epidural methylprednisolone helps in postoperative pain relief, shortens the in-hospital stay, and helps in the early resumption of activities of daily living. These are important questions and our study will try to answer these questions. Chronic low back pain is the most prevalent type of spinal pain. Any abnormality in the lumbar intervertebral discs, facet joints, sacroiliac joints, ligaments, fascia, muscles, and nerve root dura can cause lumbar spine pain with symptoms of low back pain and lower extremities discomfort.[1-5]

A meta-analysis of existing data regarding the prevalence and associations of chronic pain in the general elderly population is 56%. In a cross-sectional study carried out in Korea, the lifetime prevalence of LBP in hypertensive subjects was 54.4%. There are several therapeutic interventional procedures with reasonable evidence for persistent low back pain. One of the safe minimally invasive therapies for this is facet joint steroid injection with local anesthetic injections. A study of 78 patients who had lumbar facet joint injections for facet joints syndrome found that there was a substantial reduction in patients' symptoms. Intra-articular steroid infiltration in the facet joint appears to be a viable treatment option for chronic function-limiting low back pain of facet origin, with positive short and midterm pain reduction and function improvement outcomes. Facet joint injection is an excellent therapy for lumbar spinal stenosis patients that has a 59.5 percent cure rate and may be used safely.[6-7]

The most prevalent chronic pain problem is persistent low back pain. Because most connective tissues recover naturally after 6 – 12 weeks unless there is pathoanatomic instability, low back pain (LBP) is considered chronic beyond 3 months. Chronic LBP may persist as a result of the comparatively avascular intervertebral disk's

slower pace of tissue healing. An estimated 15-20% acquired chronic pain, with the remaining 2-8 percent suffering from prolonged discomfort. According to recent research, one-third to one-fourth of patients in a primary care environment may still be experiencing issues after a year. The lifetime incidence of low back discomfort is 50 – 70 percent, with a lower limb radiation incidence of more than 40 percent. Males suffer more than females, with a 2.6:1.5 ratio.[6-7]

The majority of radiculopathy patients react favorably to conservative therapy, and symptoms often improve between six weeks to three months. If the above-mentioned therapies do not help, individuals may benefit from an epidural steroid injection. It has been claimed that sciatica can be cured with an epidural injection. In several trials, the effectiveness of epidural steroid injection has been reported to be 65%, 64% – 81%, and 71%. If the symptoms persist despite the use of all of the aforementioned treatment methods, surgery may be a possibility.[7-11] Selective spinal injections generate concentrated and controlled anesthetic of specific anatomic tissues, assisting in the localization of pain. Aside from the diagnostic value, it also has significant anti-inflammatory effects of glucocorticoids on the local anesthetic. It is possible to adopt an interlaminar, caudal, or transforaminal approach.[12]

Epidural steroid injections are extremely beneficial in the treatment of nerve root irritation and have therapeutic potential. The epidural area is most likely the most often used place for targeted injections. Steroids decrease the synthesis or release of various inflammatory chemicals, including phospholipase A2, arachidonic acid and its metabolites, tumor necrosis factor-alpha, interleukin 1, and prostaglandin E2. Steroids also make the endothelium less adhesive to polymorphonuclear leukocytes that are at rest. Leukocytes damage endothelial membranes, increasing capillary permeability and, as a result, tissue edema. Endothelial cells that have been injured emit a range of cytokines, some of which attract monocytes and activated macrophages. When these mononuclear phagocytes get involved in the local inflammatory process, they can produce a number of inflammatory chemicals that directly trigger local and regional nociceptive nerve terminals. Thus, in radiculopathy, steroids improve both the early and late symptoms of inflammation. The most prevalent and concerning problems are of two types: those associated with needle insertion and those associated with medication delivery.[13-16]

MATERIALS AND METHODS

Study Setting & Design

A randomized controlled trial was conducted at the Department of Neurosurgery, NWGH & RC Peshawar. The study was conducted for 6 months from 11/3/2020 to 11/09/2020.

Sample Size & Method

It was 60 patients (30 in each group) using mean hospital stay and return to ADL in study group 1.3 +/- 0.9 and in control group 3.2+/- 1.2 days taking confidence interval of 95% and power of test 80% using open API sample size calculator. Consecutive non-probability sampling was considered.

Inclusion Criteria

Patients of both male and female genders between 18 to 65years of age have a diagnosis of disc herniation. Patients with ASA (American Society of Anesthesiologists) Grade 2 or lower were included.

Exclusion Criteria

Patients with severe co-morbidities rendered unfit for general anesthesia or those who underwent lumbar surgery in the past were excluded from the study. Also, we did not include any patients under 18 years of age.

Data Collection Procedure

The study was commenced after obtaining approval from the institutional review board of the hospital. The study was commenced according to the inclusion & exclusion criteria. Patients were recruited from the outpatient department, emergency department, and consultations from other departments. Informed consent was obtained from all patients before inclusion. All patients with lumbar radiculopathy on clinical history, root tension sign on physical examination, and lumbar disc herniation which is evident on an MRI of the lumbar spine were admitted. All patients were assessed by a consultant neurosurgeon (FCPS/FRCS with a minimum of 5-year experience). Detailed clinical history & examination was performed by the trainee medical officer as well.

Patient Groups

Two study groups were created where **group A** included those patients who had received topical methylprednisolone while **group B** was the control group where no topical methylprednisolone had been used. The study group assignment was done using the lottery method. Data was collected in a predesigned proforma. It included patient demographics (age, gender, address), preoperative and postoperative VAS, total analgesic requirement, time to resumption of ADL (activities of daily living), the total length of stay (LOS), and dichotomized outcome (favorable/unfavorable).

Clinical & Surgical Management

All patients were operated on under general anesthesia in the prone position and perioperative intravenous broad-spectrum antibiotics (1g Ceftriaxone). All procedures were performed by a consultant neurosurgeon (FCPS/FRCS with at least 5-year experience) using a standard posterior lumbar midline incision. Monopolar diathermy was used for paraspinal muscle dissection. A laminectomy was performed, and the herniated disc fragment was removed to relieve the affected root. After laminectomy and discectomy is complete, thorough wound wash and hemostasis were performed. In group A patients, 80 mg topical methylprednisolone (Depomedrol®) was instilled over the thecal sac, taking into measure all sterile precautions. In group B, no topical Depomedrol® was used. Closure of the wound was performed in 4 layers (muscle, lumbar fascia, subcutaneous tissue & skin) and the aseptic dressing was applied.

Postoperatively, all patients were given intravenous broad-spectrum antibiotics (1g Ceftriaxone) 12 hours apart. All patients had received 1g of paracetamol (Provas®) infusion at 8 hourly intervals. Patients were prescribed intravenous 30 mg ketorolac (Toradol®) on an as-need basis (SOS). Patients were mobilized the next morning and allowed light oral food at 6 hours postoperatively.

Assessment of Pain

During admission, the pain was assessed using the VAS on a preoperative day after admission as well as 24 hours after surgery. The total dose of Provasc® and Toradol® were calculated (in mg) which the patient has received during their stay in the hospital. All patients were discharged on the 2nd postoperative day unless an additional stay is required due to pain or other complications.

Follow-Up:

At the time of discharge, all patients were called for a follow-up visit in the outpatient department 2 weeks postoperatively. During the follow-up visit at 2 weeks, postoperative pains were assessed using the VAS and they were inquired about the resumption of ADL. The functional status of the patient was assessed using the ODI. Patients presenting with surgical complications such as wound infection and the cerebrospinal fluid leak were managed according to standard

guidelines. Dichotomized outcomes were recorded according to the predefined criteria. Patients were encouraged for follow-up visits to prevent loss to follow-up. Contact numbers were also obtained from all patients to contact them in case of a missed follow-up appointment.

Data Analysis

The data was entered and analyzed using SPSS version 25.0. Categorical variables (e.g. gender) were presented as frequencies and percentages while continuous variables (age, duration of disease, length of stay, OLBI (Oldenburg Burnout Inventory) score, VAS score, paracetamol dose, ketorolac dose, time to return to daily life activities) was presented as mean ± standard deviation. T-Test was used for determining the difference between topical Depomedrol® with postoperative pain score, analgesic requirement, and resumption of ADL.T-test was also be done for determining the difference between Depomedrol® use with favorable or unfavorable outcomes. A post-stratification T-test was performed for confounding variables such as age group, gender, and co-morbidities such as diabetes, and hypertension to determine effect modification. Statistical significance was kept at 0.05.

RESULTS

A total of 60 patients were included. Group A was the Topical methylprednisolone group, whereas, Group B was No topical methylprednisolone.

Age Distribution

In Group A, 12 (41%) patients were in the age range 18 – 35 years, and 18 (59%) patients were in the age range 35 – 65 years. The mean age was 42 ± 10.73 years. Whereas in Group B, 13 (43%) patients were in the age range 18 – 35 years, 17 (57%) patients were in the age range 36 – 65 years. The mean age was 43 ± 9.84 years **(Table 1)**.

Table 1: Age Information (n = 60).

Age	Group A	Group B	P-value from T-test
18 – 35 years	12 (41%)	13 (43%)	
36 – 6 5 years	18 (59%)	17 (57%)	0.9455
Total	30 (100%)	30 (100%)	(insignificant
Mean and SD (years)	42 ± 10.73	43 ± 9.84	result)

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone

Gender Distribution

In Group A, 18 (60%) patients were male and 12 (40%) patients were female. Whereas in Group B, 19 (62%) patients were male and 11 (38%) patients were female **(Table 2)**.

Table 2: Gender Information (n = 60).

Gender	Group A	Group B	P-value from Chi-Square Test
Male	18 (60%)	19 (62%)	0.7906
Female	12 (40%)	11 (38%)	(insignificant
Total	30 (100%)	30 (100%)	result)

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone

Duration of Disease

In Group A, 10 (33%) patients had a duration of disease ≤ 1 year and 20 (67%) patients had a duration of disease > 1 year. The mean duration of illness was 1 ± 1.83 years. Whereas in Group B, 11 (35%) patients had a duration of disease≤1 year, and 19 (65%) patients had a duration of disease > 1 year. The mean duration of illness was 1 ± 2.3 years **(Table 3)**.

Status of DM

In Group A, 8 (27%) patients were diabetic and 22 (73%) patients were non-diabetic. Whereas in Group B, 9 (30%) patients were diabetic and 21 (70%) patients were non-diabetic **(Table 4)**.

Table 3: Duration Of Disease (n=60)

Duration	Group A	Group B	P-value from T-test
< 1 years	10 (33%)	11 (35%)	1.000 (insignificant result)
>1 years	20 (67%)	19 (65%)	
Total	30 (100%)	30 (100%)	
Mean and SD (years)	1 ± 1.83	1 ± 2.37	

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone

Table 4: Diabetes Mellitus (n = 60).

Diabetes	Group A	Group B	P-value from Chi-Square Test
Diabetic	8 (27%)	9 (30%)	0.7744 (insignificant result)
Non-diabetic	22 (73%)	21 (70%)	
Total	30 (100%)	30 (100%)	

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone

Status of Hypertension

In Group A, 11 (35%) patients were hypertensive and 19 (65%) patients were non-hypertensive. Whereas in Group B, 12 (40%) patients were hypertensive and 18 (60%) patients were non-hypertensive **(Table 5)**.

Table 5: Hypertension (n = 60).

Hypertension	Group A	Group B	P-value from Chi-Square Test
Hypertensive	11 (35%)	12 (40%)	0.7906 (insignificant result)
Non-hypertensive	19 (65%)	18 (60%)	
Total	30 (100%)	30 (100%)	

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone

Outcome Assessments

In Group A, the mean hospital stay was 2 ± 1.27 days, mean OLOBII score was 35% ± 7.01, mean VAS score was 3 ± 2.09, mean time to resumption of ADL was 7 ± 1.27 days, mean dose of paracetamol (per day) was 3 ± 0.59 mg, mean dose of Ketorolac (per day) was 90 ± 7.13 mg. Whereas Group B mean hospital stay was 3 ± 2.67 days, mean OLBI score was 45% ± 5.09%, mean VAS score was 5 ± 2.34, mean time to resumption of ADL was 10 ± 2.67 days, mean dose of paracetamol (per day) was 4 ± 1.27 mg, mean dose of Ketorolac (per day) was 100 ± 9.13 mg **(Table 6)**.

Comparison Favorable/Unfavorable Outcome

The status of favorable/unfavorable outcome hypertension among two groups was analyzed as in Group A 27 (91%) patients had a favorable outcome and 3 (9%) patients had an unfavorable outcome. Whereas in Group B 25 (83%) patients had a favorable outcome and 5 (15%) patients had unfavorable outcomes **(Table 7)**.

Stratification of Outcome concerning Age Groups, Gender, DM & Hypertension

Stratification of outcomes concerning age group, gender, and co-morbidities such as diabetes, and hypertension are mentioned in **Tables 8-15**. There existed insignificant results in comparisons of outcomes (length of stay, OLBI score, VAS score, time to resumption of ADL, dose of Paracetamol& dose of Ketorolac) concerning age groups (18 – 35 years & 36 – 65 years), gender, diabetic/non-diabetic, and hypertension/non-hypertension.

Table 6: Outcome (n = 60).

Outcome	Group A	Group B	P-value (from Chi-Square)
Length of stay	2 days ± 1.27	3 days ± 2.67	0.7364
OLBI Score	35% ± 7.01%	45% ± 5.09%	0.2531
VAS score	3 ± 2.09	5 ± 2.34	0.5263
Time to Resumption of ADL (activities of daily life)	7 days ± 1.27	10 days ± 2.67	0.3145
Dose of Paracetamol (per day)	3 mg ± 0.59	4 mg ± 1.27	0.4780
Dose of Ketorolac (per day)	90 mg ± 7.13	100 mg ± 9.28	0.3963

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone. All insignificant results

Table 7: Favorable /Unfavorable Outcome (n=60).

Outcome	Group A	Group B	P-value (from Chi-Square)
Favorable	27 (91%)	25 (83%)	0.4475 (insignificant result)
Unfavorable	3 (9%)	5 (15%)	
Total	30 (100%)	30 (100%)	

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone

Table 8: Stratification of Outcome W.R.T Age (Group 18 – 35 Years).

Outcome	Group A (N = 12)	Group B (N = 13)	P value from T Test
Length of stay	2 ± 1.64 days	2 ± 1.93 days	1.0000
OLIBI Score	36 ± 5.47%	43± 5.51%	0.3775
VAS score	2 ± 1.12	4 ± 3.07	0.5594
Time to Resumption of ADL (activities of daily life)	6 ± 3.34 days	8 ± 4.29 days	0.7195
Dose of Paracetamol (per day)	3 ± 0.66 mg	5 ± 2.02 mg	0.3725
Dose of Ketorolac (per day)	90 ± 6.45 mg	110 ± 8.76 mg	0.0829

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone. All insignificant results

Table 9: Stratification of Outcome W.R.T Age (Group 36 – 65 Years).

Outcome	Group A (N = 18)	Group B (N = 17)	P value from T test
Length of stay	3 days ± 3.12	3 days ± 2.88	1.0000
OLBI Score	37% ± 4.69	46% ± 5.35	0.2134
VAS score	3 ± 1.47	6 ± 3.13	0.3833
Time to Resumption of ADL (activities of daily life)	8 days ± 2.03	12 days ± 3.17	0.2902
Dose of Paracetamol (per day)	3 mg ± 0.61	4 mg ± 1.94	0.6179
Dose of Ketorolac (per day)	90 mg ± 6.49	103 mg ± 9.20	0.2523

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone. All insignificant result

Table 10: Stratification of Outcome W.R.T Gender (Male).

Outcome	Group A (N = 18)	Group B (N = 19)	P value from T test
Length of stay	2 days ± 2.57	3 days ± 2.53	0.7833
OLBI Score	34% ± 5.99	44% ± 5.12	0.2112
VAS score	3 ± 2.04	5 ± 2.48	0.5399
Time to Resumption of ADL (activities of daily life)	7 days ± 1.30	11 days ± 2.84	0.2170
Dose of Paracetamol (per day)	3 mg ± 0.57	4 mg ± 1.25	0.4797
Dose of Ketorolac (per day)	90 mg ± 6.81	103 mg ± 9.22	0.2686

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone. All insignificant results

Table 11: Stratification of Outcome W.R.T Gender (Female).

Outcome	Group A (N = 12)	Group B (N = 11)	P value from T test
Length of stay	2 days ± 3.01	3 days ± 2.78	0.8106
OLBI Score	35% ± 5.71	45% ± 5.36	0.2177
VAS score	3 ± 2.16	6 ± 3.10	0.4297
time to Resumption of ADL (activities of daily life)	6 days ± 1.87	10 days ± 2.77	0.2377
Dose of Paracetamol (per day)	3 mg ± 0.57	4 mg ± 1.37	0.4945
Dose of Ketorolac (per day)	90 mg ± 5.94	103 mg ± 8.47	0.2166

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone. All insignificant results

Table 12: Stratification of Outcome W.R.T Diabetes Mellitus (Diabetic).

Outcome	Group A (N = 8)	Group B (N = 9)	P value from T test
Length of stay	3 days ± 2.76	4 days ± 2.83	0.8047
OLBI Score	37% ± 6.89	47% ± 6.38	0.3032
VAS score	4 ± 2.11	6 ± 2.47	0.5526
time to Resumption of ADL	8 days ± 2.75	12 days ± 3.13	0.3577
Dose of Paracetamol (per day)	3 mg ± 0.65	5 mg ± 3.04	0.5527
Dose of Ketorolac (per day)	90 mg ± 6.97	112 mg ± 10.10	0.1009

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone. All insignificant results

Table 13: Stratification of Outcome W.R.T Diabetes Mellitus (Non-Diabetic).

Outcome	Group A (N = 22)	Group B (N = 21)	P value from T Test
Length of stay	2 days ± 1.41	3 days ± 2.59	0.7331
OLIBI Score	35% ± 6.61	45% ± 5.20	0.2441
VAS score	3 ± 2.08	5 ± 2.23	0.5151
time to Resumption of ADL	7 days ± 1.30	10 days ± 2.54	0.2928
Dose of Paracetamol (per day)	3 mg ± 0.60	4 mg ± 1.29	0.4796
Dose of Ketorolac (per day)	90 mg ± 6.88	100 mg ± 9.03	0.3808

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone. All insignificant results

Table 14: Stratification of Outcome W.R.T Hypertension (Hypertensive).

Outcome	Group A (N = 11)	Group B (N = 12)	P value from T Test
Length of stay	3 days ± 2.84	3 days ± 2.90	1.0000
OLIBI Score	35% ± 5.94	46% ± 6.44	0.2256
VAS score	3 ± 2.69	5 ± 2.40	0.5837
time to Resumption of ADL	7 days ± 1.69	10 days ± 2.71	0.3684
Dose of Paracetamol (per day)	3 mg ± 0.70	5 mg ± 2.38	0.4467
Dose of Ketorolac (per day)	90 mg ± 7.01	104 mg ± 9.81	0.2663

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone. All insignificant results

Table 15: Stratification of Outcome W.R.T Hypertension (Non-Hypertensive).

Outcome	Group A (N= 19)	Group B (N= 18)	P value from T Test
Length of stay	2 days ± 1.51	3 days ± 2.48	0.7295
OLIBI Score	35% ± 6.91	45% ± 5.95	0.2826
VAS score	3 ± 2.19	5 ± 2.34	0.5362
Time to Resumption of ADL	7 days ± 1.30	10 days ± 2.53	0.2913
Dose of Paracetamol (per day)	3 mg ± 0.65	5 mg ± 3.04	0.5137
Dose of Ketorolac (per day)	90 mg ± 7.05	100 mg ± 9.20	0.3911

Group A: Topical methylprednisolone; **Group B:** No topical methylprednisolone. All insignificant results

Radiography of Patients

Figure 1 shows a normal X-ray of the lumbosacral spine. **Figure 2** shows a nerve root block upon X-rays.

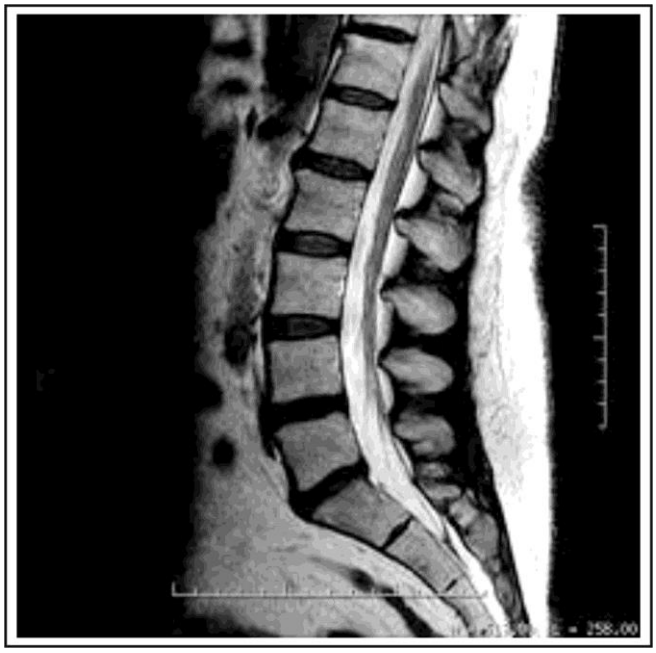

Figure 1: Normal MRI of Lumbo-sacral Spine. (image used with patient's permission).

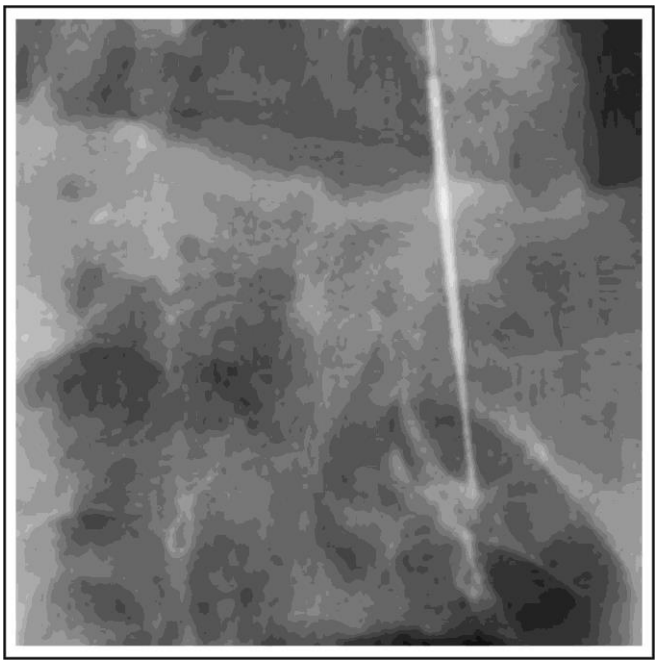

Figure 2: Nerve root block (image used with patient's permission).

DISCUSSION

Since the evidence regarding the use of topical epidural methylprednisolone in lumbar disc surgery is still developing, it will be pertinent to

conduct a randomized study that may answer whether the use of topical epidural methylprednisolone helps in postoperative pain relief, shortens the in-hospital stay, and helps in the early resumption of activities of daily living. Low backache is a highly common disorder with a lifetime prevalence of up to 80%. Two to five percent of patients presenting with radiculopathy are due to lumbar disc herniation. Among these patients between 10% to 20% will eventually undergo surgery. The commonly used approaches for lumbar disc herniation include trans-canal procedures such as microdiscectomy, laminectomy, and endoscopic discectomy. Studies have reported a favorable outcome of 60% to 80%. Different strategies have been used to decrease postoperative pain. Perioperative use of corticosteroids and bupivacaine is reported to be effective in reducing pain and decreasing analgesic requirements without complications. Local or systemic steroids of different types are present in the literature. The use of anesthetic agent infiltration before incision or closing wound is another way to decrease postoperative pain and early mobilization. All these modalities aim to reduce postoperative pain, early mobilization, and resumption of daily life activities.[1-7]

Our study correlated with another study carried out by Aljabi et al.[17] in which differences in the (ODI) scores were statistically significant at all post-operative intervals. Our study also correlated with another study carried out by Modi et al.[18] in which the use of the topical epidural steroid has a role in decreasing postoperative pain. They categorized patients into two groups, i.e., the study or steroid group and the control group with no epidural steroids. When preoperative VAS ratings from two groups were examined, they did not vary significantly. At two weeks, the control and steroid groups had VAS ratings of 3.92 and 2.96, respectively, and at one month, 3.03 and 2.54, showing a significant reduction in back pain compared to the preoperative state. There was a statistically significant difference in VAS score at two weeks and one month postoperatively when the control and steroid groups were compared. Our study correlated with another study carried out by Du et al.[19] found that the VAS scores of low back pain and leg pain in the intervention group were lower than those in the control group.

Ranguis et al.[20] evaluated the effectiveness of epidural steroids in people following lumbar spine surgery for degenerative spinal disease. Epidural steroids have been shown to reduce discomfort and duration of stay in people following lumbar spine surgery for degenerative spinal disease. The majority of the data comes from unvalidated studies that selectively cite good results. More study is needed before perioperative epidural steroids can be established as a useful complement to surgery for long-term pain relief.[20] The cervical post-surgical syndrome is becoming more prevalent as the number of cervical surgical treatments increases. Cervical spine surgery may fail in a subset of patients who have persistent discomfort due to pseudoarthrosis, adjacent segment degeneration, insufficient decompression, iatrogenic instability, facet joint arthritis, deformity, or spinal stenosis. One of the most prevalent nonsurgical approaches for addressing cervical post-surgery syndrome is epidural steroid injections. However, no comprehensive analyses of the usefulness of cervical epidural injections in cervical post-surgery syndrome have been conducted.[21] Manchikanti et al,[21] reported that the cervical interlaminar epidural injections with or without steroids were beneficial in 67 percent of patients overall, 87 percent in Group I and 72 percent in Group II, in patients with chronic function-limiting neck pain and upper extremity discomfort owing to cervical post-surgery syndrome.

Kennedy et al,[22] mentioned that despite a high success rate at 6 months, the majority of participants had a return of symptoms at some point within the next 5 years. Fortunately, few people reported continuing problems, and only a tiny percentage needed further injections,

surgery, or opiate pain relievers. Lumbar disc herniation is a condition that can be efficiently treated in the short term with TFESI (transforaminal lumbar epidural steroid injection) or surgery, but recurrence rates are significant regardless of therapy.[22] There is evidence that epidural steroids reduce discomfort and duration of stay in people following lumbar spine surgery for degenerative spinal disease.[23] The results of the current study will aid in the establishment of local statistics on the effectiveness of facet joint steroid injection for chronic low back pain in our population. This will assist us in lowering the cost of therapy as well as the frequency of OPD visits associated with persistent low back pain.

CONCLUSION & RECOMMENDATION

Our study concludes that the use of topical intraoperative methylprednisolone in lumbar disc surgery leads to significant improvement in pain relief and early resumption of daily life activities as compared to without the use of topical methylprednisolone. The majority of the data comes from research with unvalidated outcomes that selectively claim good results. More study is needed before perioperative epidural steroids can be established as a useful complement to surgery for long-term pain reduction.

REFERENCES

1. Jamjoom BA, Jamjoom AB. Efficacy of intraoperative epidural steroids in lumbar discectomy: a systematic review. BMC Musculoskel Dis. 2014; 15: 146-.
2. Glasser RS, Knego RS, Delashaw JB, Fessler RG. The perioperative use of corticosteroids and bupivacaine in the management of lumbar disc disease. Journal of Neurosurgery, 1993; 78 (3): 383-7.
3. Liu MM, Reidy AB, Saatee S, Collard CD. Perioperative Steroid Management: Approaches Based on Current Evidence. Anesthesiology, 2017; 127 (1): 166-72.
4. Wang F, Shi K, Jiang Y, Yang Z, Chen G, Song K. Intravenous glucocorticoid for pain control after spinal fusion: A meta-analysis of randomized controlled trials. Medicine, 2018; 97 (20): e10507-e.
5. Kumari K, Kamal M, Singariya G, Kishan R, Garg S, Thanvi S. Effect of epidural levobupivacaine with or without dexamethasone soaked in gelfoam for postoperative analgesia after lumbar laminectomy: A double blind, randomised, controlled trial. Indian Journal of Anaesthesia, 2018; 62 (7): 509-15.
6. Aljabi Y, El-Shawarby A, Cawley DT, Aherne T. Effect of epidural methylprednisolone on post-operative pain and length of hospital stay in patients undergoing lumbar microdiscectomy. Surgeon, 2015; 13 (5): 245-9.
7. Modi H, Chung KJ, Yoon HS, Yoo HS, Yoo JH. Local application of low-dose Depo-Medrol is effective in reducing immediate postoperative back pain. Int Orthop. 2009; 33 (3): 737-43.
8. Lee JW, Kim SH, Choi JY, Yeom JS, Kim KJ, Chung SK, et al. Transforaminal epidural steroid injection for lumbo-sacral reddiculopathy: preganglionic versus conventional approach. Korean J Radiol. 2006; 7: 139-44.
9. Kovacs FM, Femandez C, Cardero A, Muriel A, Gonzalez-lujan L. Gildel Real MT. Spanish back pain research net work. Non specific low back pain in primary care in the Spanish National Health Service, a prospective study on clinical outcomes & determination of management. BMC health Serv Res. 2006: 6; 57.
10. Peul WC, van-houwelingen HC, van den Hout WB, brand R, Eekhof JA, Tans JT, et al. "Surgery versus prolonged conservative treatment for sciatica". N Engl J Med. 2007; 356 (22): 2245-56.
11. O'Rahilly R. Human embryology and teratology. New York: John Wiley & Sons, 1996.
12. Weiner BK, Fraser RD. Foraminal injection for lateral lumbar disc herniation. J Bone Joint Surg Br. 1997; 79: 804-7.
13. DiRosa M, Calignano A, Carnuccio R, Ialenti A, Sautebin L. Multiple control of inflammation by glucocorticoids. Agents Action, 1985; 17: 284–9.
14. Cronstein BN, Kimmel SC, Levin RI, Martiniuk F, Weissman G. A mechanism for the anti-inflammatory effects of corticosteroids: the glucocorticoid receptor regulates leukocyte adhesion to endothelial cells and expression of

endothelial-leukocyte adhesion molecule-1 and intercellular adhesion molecule-1. Proc Natl Acad Sci USA, 1992; 89: 9991–5.
15. Varani J, Ginsburg I, Schuger L. Endothelial cell killing by neutrophils: synergistic interaction of oxygen products and proteases. Am J Pathol. 1989; 135: 435–8.
16. Rappolee DA, Werb Z. Secretory products of phagocytes. Curr Opin Immunol. 1988; 1: 47–55.
17. Aljabi Y, El-Shawarby A, Cawley DT, Aherne T. Effect of epidural methylprednisolone on post-operative pain and length of hospital stay in patients undergoing lumbar microdiscectomy. Surgeon, 2015; 13 (5): 245-9.
18. Modi H, Chung KJ, Yoon HS, Yoo HS, Yoo JH. Local application of low-dose Depo-Medrol is effective in reducing immediate postoperative back pain. Int Orthop. 2009; 33 (3): 737-43.
19. Du JP, Fan Y, Hao DJ, Huang YF, Zhang JN, Yuan LH. Application of Gelatin Sponge Impregnated with a Mixture of 3 Drugs to Intraoperative Nerve Root Block to Promote Early Postoperative Recovery of Lumbar Disc Herniation. World Neurosurg. 2018; 114: e1168-e73.
20. Ranguis SC, Li D, Webster AC. Perioperative epidural steroids for lumbar spine surgery in degenerative spinal disease: a review. Journal of Neurosurgery: Spine, 2010 Dec. 1; 13 (6): 745-57.
21. M, Manchikanti L. et al. Fluoroscopic cervical interlaminar epidural injections in managing chronic pain of cervical post surgery syndrome: preliminary results of a randomized, double-blind, active control trial. Pain Physician, 2012 Jan; 15: 13-26.
22. Kennedy DJ, Zheng PZ, Smuck M, McCormick ZL, Huynh L, Schneider BJ. A minimum of 5-year follow-up after lumbar transforaminal epidural steroid injections in patients with lumbar radicular pain due to intervertebral disc herniation. The Spine Journal, 2018 Jan. 1; 18 (1): 29-35.
23. Ranguis SC, Li D, Webster AC. Perioperative epidural steroids for lumbar spine surgery in degenerative spinal disease: a review. Journal of Neurosurgery: Spine, 2010 Dec. 1; 13 (6): 745-57.

Additional Information

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In compliance with the ICMJE uniform disclosure form, all authors declare the following:
Financial Relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.
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AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Muhammad Tariq	1. Study design and methodology.
2.	Muhammad Farooq	2. Paper writing, referencing, and data calculations.
3.	Mushtaq Ahmad Mian, Mustafa Qazi	3. Data collection and calculations.
4.	Irfan Jan	4. Interpretation of results etc.
5.	Adnan Munir	5. Literature review and manuscript writing.
6.	Faiqa Filza, Waseem Dad Khan	6. Analysis of data.