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RESEARCH ARTICLE

ASSESSMENT OF THE EFFECT OF EPIDURAL STEROID INJECTION IN PATIENT HAVING LUMBAR RADICULOPATHY

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Abstract

ESIs are perhaps the most commonly used conservative interventional treatment for lumbosacral radiculopathy and have been shown to reduce pain and improve function in well-selected patients, often for months. ESIs play an integral role as part of a multimodal treatment strategy to treat lumbar radicular pain and theoretically present fewer risks than surgical interventions. Numerous studies over the past 50 years have demonstrated efficacy and safety leading to high utilization in treating lumbosacral radiculopathy. Overall, complication rates are low, with pain at the injection site being the most common. Systemic side effects such as elevated blood glucose may also occur. According to our study, the use of ESI is more effective for alleviating lumbosacral radicular pain than conservative treatments in terms of short-term and intermediate-term and hence proving our use of ESI for pain management.

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Introduction:-

Lumbosacral radicular pain, is characterized by back pain radiating into the lower limbs,^[1] and is usually caused by the compression of a nerve root due to lumbar disc herniation or spinal stenosis.^[2] This compression can result in tingling, radiating pain, numbness, paresthesia, and occasional shooting pain. Lower back (the lumbar-sacral radiculopathy) is the commonest site for radiculopathy, followed by in neck (cervical radiculopathy).^[3]

Nearly 80% of the general population suffer from low back pain at some point in their lifetime.^[4] There is a lacuna in the concise epidemiological data, but most reports estimate about 3% to 5% prevalence of lumbosacral radiculopathy in the patient populations.^[5]

Lumbosacral radiculopathy is a very common complaint and in majority of the patients it is benign and resolves spontaneously. Conservative management is the most appropriate first step in the absence of clinical red flag symptoms. In cases where symptoms fail to resolve, imaging studies, electromyography, and nerve conduction studies help in arriving at the diagnosis.^[5]

Radiculopathy and radicular pain commonly occur together, but radiculopathy can occur in the absence of pain and radicular pain can occur in the absence of radiculopathy.^[6] Thus, radiculopathy can be defined as the whole complex of symptoms that arise from nerve root pathology, including anesthesia, paresthesia, hypoesthesia, motor loss and pain.^[7]

The common non-surgical treatments for lumbosacral radicular pain includes lifestyle modification, education, analgesic medication, physical therapy, exercise and/or epidural steroid injections.^[8]The epidural steroid injections are the most commonly performed procedures for the relief of lumbosacral radicular pain.^[9]They are performed to deliver steroids or local anesthetics to the site of pathology in the epidural space via a transforaminal, interlaminar, or caudal approach. In patients who fail on conservative management are considered for surgical intervention.^[10]

Various studies and systematic reviews have proven the efficacy of transforaminal epidural steroid injections in the management of chronic radicular back pain.^[11,12]

The present study was conducted to rationalize the study of epidural steroid injection in patients having lumbar radiculopathy. The aim of the present study was to assess the effect of epidural steroid injection in patients having lumbar radiculopathy. The objectives include (a) to assess the functional outcome of patients with intervertebral disc prolapse (PIVD) and lumbar canal stenosis (LCS) after epidural steroid injection by Revised Oswestry Disability Index Scores; and (b) to study the associated complications of epidural steroid injection in these patients.

Material & Methods:-

The present observational study was conducted in the Department of Orthopaedics, Sri Aurobindo Medical College & Postgraduate Institute, Indore (M.P.) from 01.04.2021 to 30.09.2022 on patients attending the orthopaedic department, with complaints of lumbar radiculopathy with intervertebral disc prolapse (PIVD) or lumbar canal stenosis.

The protocol of the present study was approved by the Institutional Ethics Committee and all the rights of the patients were explained to them in their own language. All the study related procedures were conducted after obtaining the voluntary written informed consent form from the patients. Only the data relevant to the research was used for analysis, keeping all the personal information of the patients confidential.

Of the total 18 months study duration, 9 months were allocated for data collection and 6 months for follow-up. And the remaining 3 months were used for data analysis and article writing work.

All clinically and radiologically proven cases of lumbar radiculopathy with intervertebral disc prolapse or lumbar canal stenosis, failed conservative management for more than 6 weeks and having Revised Oswestry Disability Index Score of more than 40% at admission of any sex with age more than 18 years were included. Patients with neurological deficits; those hypersensitive to injectable substances; having any systemic infection or local infection at the injection site; pregnant and lactating women; and those not willing to provide their voluntary informed consent for participation in the study, were excluded.

We included 30 patients with lumbar radiculopathy with intervertebral disc prolapse or lumbar canal stenosis. All the patients underwent thorough physical, clinical and radiological evaluation. Preoperative profile and preanesthetic checkup were conducted prior to the start of the procedure. Written informed consent was also obtained from the patient and/or his/her legally acceptable representative for the procedure being conducted.

Epidural injection procedure

Patient was made to lie down on the operation table and all the monitoring devices were connected. A 20-G intravenous catheter was inserted and 1 pint of normal saline was started.

The patient was positioned to sit with his/her legs on the side of the table resting on a stool. The back of the patient was painted and draped. Anatomic levels of the interspinous spaces were identified with the help of the landmark, i.e., iliac crest at the level of L3-L4 space.

After the identification of the epidural steroid injection level, 10 ml of 2% lignocaine was injected at that level and waited for 20 seconds for the local anesthesia to act. Then 18-G Touhey needle was inserted at that level as the needle crossed the ligamentum flavum and give away of resistance was felt, it confirmed that epidural space is reached. A premixed solution of 2ml of 80mg methylprednisolone, 3 ml of 2% lignocaine and 5ml of normal saline (total 10 ml) was injected in the epidural space and patient was advised to lie in supine position for 10 minutes. After that the patient was shifted to the recovery room, where monitoring was continued for another 2 hours and then the patient was discharged. The patient was either discharged on the same day or a day after the procedure.

Follow-up

These patients were followed-up at 48 hours, 1 month, 3 months and 6 months from the date of injection. At each follow-up, Oswestry Disability Index scores were noted. Most of the patients were followed-up telephonically.

Statistical Analysis Plan

Statistical software IBM SPSS Version 20.0.0.0 was used for calculating the P values. Descriptive statistics was presented in the form of numbers and percentages. Comparison of mean Oswestry Disability Index Scores within the group at different follow-up was done using Paired 't' test. A P value of <0.05 was taken as statistically significant.

Results:-

We included 50 patients with lumbar radiculopathy with intervertebral disc prolapse or lumbar canal stenosis in the study. There were 31 (62%) males and 19 (38%) females in the study. (Table 1)

Table 1:- Distribution according to sex.

Sex	Number (No.)	Percentage (%)
Female	19	38.0
Male	31	62.0
Total	50	100.0

1 (2%) patient was in the age group ≤ 20 years, 20 (40%) patients were in the age group 21-40 years, 21 (42%) patients were in the age group 41-60 years, and 8 (16%) patients were in the age group greater than 60 years. The mean age of the patients was 45.36 ± 14.09 years (Range: 19 to 86 years). (Table 2)

Table 2:- Distribution according to age.

Age	Number (No.)	Percentage (%)
≤ 20 years	1	2.0
21-40 years	20	40.0
41-60 years	21	42.0
>60 years	8	16.0
Total	50	100.0

1 (2%) patient had bronchial asthma, 5 (10%) patients had diabetes mellitus type-2 and 4 (8%) patients had hypertension. No comorbidities were reported in 41 (82%) patients.

2 (4%) patients had pathology at L3-L4, L5-S1 level, 18 (36%) patients had pathology at L4-L5 level, 24 (48%) patients had pathology at L4-L5, L5-S1 level, and 6 (12%) patients had pathology at L5-S1 level. (Table 3)

Table 3:- Distribution according to level of pathology.

Level of Pathology	Number (No.)	Percentage (%)
L3-L4, L4-L5	2	4.0
L4-L5	18	36.0
L4-L5, L5-S1	24	48.0
L5-S1	6	12.0
Total	50	100.0

Headache was seen in 3 (6%) patients at 48 hours after the procedure, which resolved within 1 month following the procedure. None of the patients ever complained of any complications till 6 months postoperatively.

The mean preprocedure Oswestry Disability Index Score was 35.40 ± 5.82 ; at 48 hours postoperatively, it was 23.08 ± 4.59 ; at 1 month, it was 19.68 ± 8.26 ; at 3 months, it was 18.86 ± 10.37 ; and at 6 months, it was 17.76 ± 12.90 . The mean Oswestry Disability Index Score showed persistent statistically significant improvement from preprocedure time till 6 months follow-up ($P < 0.05$). (Table 4)

Table 4:- Distribution according to Oswestry Disability Index (ODI).

Oswestry Disability Index (ODI)	No.	Mean \pm SD	't' value, df	P value
Pre-procedure	50	35.40 ± 5.82	18.670, df=49	0.001*
At 48 hours	50	23.08 ± 4.59		
At 48 hours	50	23.08 ± 4.59	4.726, df=49	0.001*
At 1 month	50	19.68 ± 8.26		

At 1 month	50	19.68 ± 8.26	2.165, df=49	0.035*
At 3 months	50	18.86 ± 10.37		
At 3 months	50	18.86 ± 10.37	2.636, df=49	0.011*
At 6 months	50	17.76 ± 12.90		

Discussion:-

We found epidural steroid injection to be very effective in patients with lumbar radiculopathy. The mean age of the patients in the present study was 45.36 ± 14.09 years and this age group is most prone to lumbar radiculopathy, which is supported by Tarulliet al. who reported that the symptoms begin in midlife, with men often affected in their 40s, while women are affected in the 50s and 60s.^[1] In our study there was a male preponderance and it was supported by Jordan et al., study, who reported that lumbar radiculopathy to be commoner in males.^[13] Comorbidities seen in our study were bronchial asthma, diabetes mellitus type-2 and hypertension. Most of the patients did not have any comorbidities.

In our study, 48% of the patients had pathology at the levels of L4-L5 and L5-S1. The areas which are most susceptible to injuries are L4-L5 and L5-S1. These levels are the areas that are responsible for the majority of the movement of the lumbar spine. Roughly 90% of compressive lumbosacral radiculopathies occur at either of these levels.^[14]

Headache was reported by 3 patients after 48 hours of the procedure, which resolved within 1 month of the procedure. Apart from these 3 patients, none of the other patients reported any adverse events.

The mean Oswestry Disability Index score (ODI) at baseline was 35.40 ± 5.82 which significantly reduced to 17.76 ± 12.90 at 6 months after the patients received the steroid injection. Iversen et al., in their sham-controlled study reported a significant reduction in ODI to 15.5 ± 13.3 (at follow-up) from 30.0 ± 13.2 (at baseline) after receiving an epidural injection of glucocorticoids.^[15] In Sencanet al. study, the median preprocedure ODI was 48, which significantly reduced to 22 at 3 months follow-up.^[16] In another study done Hashemi et al., the preprocedure mean functional disability score was 47.23 and it was 37 after intervention. There was a significant reduction in the mean functional disability score.^[17] All these studies showed favourable results.

Conclusion:-

We found epidural steroid injection to be very effective in improving the functional outcome in patients with lumbar radiculopathy. Only minor adverse event like headache was reported by few of the patients, which also resolved within a short period of time.

Hence, we recommend the use of epidural steroid injection in patients with lumbar radiculopathy.

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