



A Study on management of lumbar disc disease with caudal epidural steroid injection

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Abstract

Background: Lumbar disc disease is the most common cause of chronic low backache and radicular lower limb pain. It can lead to severe discomfort and impairment of daily activities to the patient causing both physical and mental trauma to the patient. The initial treatment of lumbar disease is conservative with analgesia, physical therapy and local epidural steroid injections. The purpose of this study was to evaluate the effectiveness of caudal epidural steroid injections in the management of pain due to lumbar disc disease.

Methods: This was a prospective observational study conducted on 70 patients of either sex with an average age of 38.14 years, presenting to the Orthopaedic OPD of SHKM Government Medical College Hospital, Nalhar, NUH, Haryana between June 2016 and October 2017, with a diagnosis of lumbar disc disease. All the patients were treated with caudal epidural injection and the results were analysed through the assessment of Visual Analog Score (VAS) and Japanese Orthopaedic Association (JOA) Score. The patients were followed up for a period of 1 year after the injection.

Results: Majority of the patients had significant relief with this method. The Visual Analog Score (VAS) and Japanese Orthopaedic Association (JOA) Score improved from the pre-treatment values of 8.23 and 12.72 to 2.94 and 25.12 respectively, which was found to be statistically significant (p value < 0.001).

Conclusions: Thus results of our study demonstrate that the caudal epidural steroid injection is a safe and effective method of treatment of lumbar disc disease.

Level of Evidence: Therapeutic level IV.

Keywords: Lumbar disc disease, caudal epidural steroid injection.

Introduction

Chronic low back pain and sciatica caused by lumbar disc disease is a common clinical entity faced by orthopaedic surgeons on a daily routine basis. The back pain associated with lumbar disc disease is most common in the third and fourth decades of life.¹ This pain often is brought on by

heavy exertion, repetitive bending, twisting, or heavy lifting. The pain usually begins in the lower back, radiating to the sacroiliac region and buttocks. The pain can radiate down the posterior thigh. Radicular pain usually extends below the knee and follows the dermatome of the involved nerve root. Low back pain is a common medical

problem in the society and is the cause of severe physical and psychological trauma to the patients.^{2,3,4} The total cost of low back pain in the United States is greater than \$100 billion per year, one third are direct costs for care, with the remaining costs resulting from decreased productivity, lost wages, and absenteeism.^{5,6,7}

The initial treatment of pain associated with lumbar disc disease is conservative involving rest, anti-inflammatory and muscle relaxant medications, physical therapy, traction and training regarding proper body posture. The patients who don't respond to these modalities can be managed by local epidural steroid injections. The first epidural drug application was performed at 1885 by James Comings⁸ who had applied epidural cocaine through T11-T12 space. The use of epidural steroid injections has gradually increased in the last five decades. Epidural steroids are believed to act by inhibiting the synthesis or release of the inflammatory substances thereby, reducing the intra-neural edema and venous congestion. Several studies^{9,10,11,12} have demonstrated the effectiveness of epidural steroids in the management of lumbar disc disease.

In the present study, we evaluated the effectiveness of caudal epidural steroid injections in the management of lumbar disc disease through the assessment of Visual Analog Score (VAS) and Japanese Orthopaedic Association (JOA) Score.

Methods

After approval by the institutional ethics committee and informed written consent, the study was started. This was a prospective observational study conducted on 70 patients of either sex with an average age of 38.14 years presenting to the Orthopaedic OPD of SHKM GOVERNMENT MEDICAL COLLEGE HOSPITAL, NALHAR, NUH, HARYANA between June 2016 and October 2017, with low back pain due to lumbar disc disease. The sex distribution was 33 females and 37 males.

Inclusion criteria

1. Age greater than 18 years.
2. MRI documented lumbar disc disease.
3. History of trial of conservative treatment given in the form of analgesic drugs and physical therapy.
4. No history of previous lumbar spine surgery.

Exclusion criteria

1. Age less than 18 years.
2. No evidence of lumbar disc disease on MRI.
3. No history of trial of conservative treatment given.
4. History of previous lumbar spine surgery.
5. Neurological deficit.
6. Cauda Equina syndrome.
7. History of allergic reaction to local anaesthetic or corticosteroids.

Before the procedure, all the patients were thoroughly examined and proper history was taken. Visual Analog Score (VAS) and Japanese Orthopaedic Association (JOA) Score were measured. Complete blood count was done. The procedure was explained to the patients in detail and informed consent was taken.

Procedure

The patients were placed in a prone position on a fluorescent operating table. The skin was sterilised in standard fashion from lumbosacral junction to the tip of the coccyx with povidone iodine and spirit. Draping was done in standard fashion. The sacral hiatus was identified as a gap between the two horns of the sacral cornua. A 22-gauge, 3½-inch spinal needle was inserted between the sacral cornua at about 45 degrees with the bevel of the spinal needle facing ventrally until contact with the sacrum was made. The spinal needle was redirected more cephalad, horizontal and parallel to the table, advancing it into the sacral canal through the sacrococcygeal ligament and into the epidural space. The stylet was removed and aspiration was done to check for blood and cerebrospinal fluid. A 10 ml volume containing

normal saline (6ml), 2% xylocaine (2ml) and methylprednisolone 80 mg (2ml) was injected. The patients were discharged the same day, were prescribed oral antibiotics and analgesics for 5 days and were informed about precautions and posture training was given. The patients were followed up monthly for 1 year. At the end of 1 year the Visual Analog Score (VAS) and Japanese Orthopaedic Association (JOA) Score were again measured and the data collected was subjected to analysis.

Statistical Methods

The data was analysed with SPSS version 17.0 software. The demographic variables were assessed by number and percentage. Simple arithmetic mean was used for the description of the values of Visual Analog Score (VAS) and Japanese Orthopaedic Association (JOA) Score. A

decrease in values of Visual Analog Score (VAS) and an increase in the value of Japanese Orthopaedic Association (JOA) Score from the pretreatment period to the follow up period was indicative of relief from the symptoms of the disease. A p value < 0.05 was taken to be statistically significant.

Visual Analog Score (VAS)

This score was assessed by a scale ranging from 0 to 10, with 0 representing no pain at all, while 10 representing the worst possible unbearable pain.

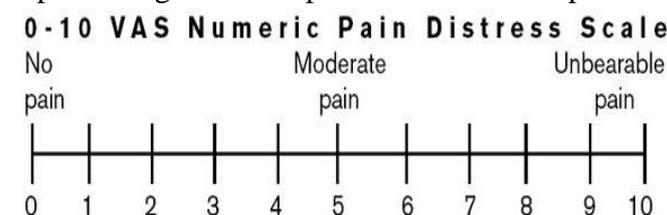


Table 1 Japanese Orthopaedic Association (JOA) Score

A normal person has JOA Score of 29.

1. Subjective symptoms (9 points)
a. Low back pain None (3), occasional mild pain (2), frequent mild or occasional severe pain (1), frequent or continuous severe pain (0)
b. Leg pain and/or tingling None (3), occasional slight symptom (2), frequent slight or occasional severe symptom (1), frequent or continuous severe symptom (0)
c. Walking capacity Normal (3), Able to walk more than 500 metres although it results in pain, tingling and /or muscle weakness (2), Unable to walk more than 500 metres owing to leg pain, tingling and/or muscle weakness (1), Unable to walk more than 100 metres owing to leg pain, tingling and/or muscle weakness (0)
2. Objective findings (6 points)
a. SLR test Normal (2), 30° to 70° (1), < 30° (0)
b. Sensory disturbance None (2), slight disturbance (1), marked disturbance (0)
c. Motor disturbance Normal (grade 5) (2), slight weakness (grade 4) (1), marked weakness (grade 3) (0)
3. Restriction of ADL (14 points)
Turn over while lying, standing, washing the face, leaning forwards, sitting (about one hour), lifting or holding heavy objects, walking: No restriction (2), moderate restriction (1), severe restriction (0) for each item
4. Bladder function (-6 points)
Normal (0), mild dysuria (-3), severe dysuria (-6)

Results

This was a prospective observational study. Most of the patients in our study had a significant improvement of their symptoms with the caudal epidural injection. The mean value of the Visual

Analog Score (VAS) improved from pretreatment value of 8.23 to 2.94 at follow up, while the mean value of Japanese Orthopaedic Association (JOA) score improved from a treatment value of 12.72 to 25.12 at follow up. Both of these changes were

found to be statistically significant (p value< .001). Four patients did not show any improvement, three of them improved with repeat injections, while one of them failed to improve with repeat injections and required surgery in the form of microdissectomy.

Table 2. Age distribution

Age in years	No. of patients	Percentage(%)
21-30	14	20
31-40	26	37.14
41-50	21	30
51-60	9	12.86
Total	70	100

Table 3 Sex Distribution

Gender	No. of patients	Percentage(%)
Male	37	52.86
Female	33	47.14
Total	70	100

Table 4 Table depicting the results of the study

Parameter.	Mean value of the parameter before treatment.	Mean value of the parameter at 1 year follow up.	p value
Visual Analog Score (VAS).	8.23	2.94	< 0.001
Japanese Orthopaedic Association Score (JOA)	12.72	25.12	< 0.001

Discussion

Low back pain due to lumbar disc disease is a common orthopaedic ailment affecting the modern society with physical, psychological and economic implications on the public health. Initially, prolapsed disc was believed to cause back and leg pain by mechanically compressing the nerve roots, however recent advances suggest that leakage of the contents of the nucleus pulposus, causes pain producing an inflammatory reaction in the disc itself, around the facet joint and a chemical neuroradiculitis due to the synthesis of various inflammatory mediators.^{13,14,15} Several treatment modalities have been devised for the treatment of low back pain due to lumbar disc disease. Epidural steroid injections have emerged as an important treatment modality for lumbar disease in the last five

decades. The efficiency of epidural steroid applications is related to breakage of the inflammation cascade and concurrent suppression of adhesion and fibrosis, associated with lumbar disc disease.¹⁶

In the present study, we evaluated the effectiveness of the caudal epidural steroid injections in the management of lumbar disc disease through the assessment of Visual Analog Score (VAS) and and Japanese Orthopaedic Association (JOA) Score (Table 1.)A decrease in values of Visual Analog Score (VAS) and an increase in the value of Japanese Orthopaedic Association (JOA) Score from the pretreatment period to the follow up period was indicative of relief from the symptoms of the disease. This was a prospective observational study conducted on 70 patients of either sex (Table 3.) with an average age of 38.14 years (Table 2.). All the patients were treated with caudal epidural steroid injections and were followed up for a period of 1 year. The Visual Analog Score (VAS) and Japanese Orthopaedic Association (JOA) score were measured before treatment and at follow up. Most of the patients in our study had a significant improvement of their symptoms with the caudal epidural injection. The mean value of the Visual Analog Score (VAS) improved from pretreatment value of 8.23 to 2.94 (Table 4.) at follow up, while the mean value of Japanese Orthopaedic Association (JOA) score improved from a treatment value of 12.72 to 25.12 (Table 4.) at follow up. Both of these changes were found to be statistically significant (p value< .001). There were no major complications in our study patients. Four patients did not show any improvement, three of them improved with repeat injections, while one of them failed to improve with repeat injections and required surgery in the form of microdissectomy. The results of our study are quite comparable to other studies done about this procedure.^{17,18,19} In the study by Pandey¹⁷ 82 patients received caudal epidural injection and the mean value of JOA Score improved from 15.39 to 24.02 at follow up

of 1 year which compares quite favourably to our study. In the study by Atci et al¹⁸ 50 patients were included and the mean value of VAS score improved from 7.97 to 4.96 at follow up, which compares quite favourably to our study. In the study by Murakibhavi et al¹⁹ the mean value of VAS score improved from 8.06 to 2.69 at follow up, which is quite comparable to our study.

Conclusion

From the above analysis we can infer that caudal epidural steroid injection is a safe and highly effective modality of treatment for lumbar disc disease.

References

- Battié MC, Videman T, Parent E. Lumbar disc degeneration: epidemiology and genetic influences. *Spine* 2004; 29:2679.
- Svensson HO, Andersson GBJ. Low back pain in 40- to 47-year-old men: work history and work environment factors. *Spine* 1983; 8:272.
- Svensson HO, Andersson GBJ. The relationship of low-back pain, work history, work environment and stress: a retrospective cross-sectional study of 38- to 64-year-old women. *Spine* 1989; 14:517.
- Katz JN. Lumbar disc disorders and low-back pain: socioeconomic factors and consequences. *J Bone Joint Surg* 2006; 88A (suppl 2):21.
- Frymoyer JW, Cats-Baril WL. An overview of the incidences and costs of low back pain. *OrthopClin North Am* 1991; 22:263.
- White AWM. Low back pain in men receiving workmen's compensation: a follow-up study. *Can Med Assoc J* 1969; 101:61.
- Wasiak R, Kim JY, Pransky G. Work disability and costs caused by recurrence of low back pain: longer and more costly than in first episodes. *Spine* 2006; 31:219.
- Corning JL. Spinal anaesthesia and local medication of the spinal cord. *New York Medical Journal*. 1885;31:483–85.
- Brown FW. Management of discogenic pain using epidural and intrathecal steroids. *ClinOrthop* 1977; 129:72.
- Kepes ER, Duncalf D. Treatment of backache with spinal injections of local anesthetics, spinal and systemic steroids. A review. *Pain* 1985; 22:33.
- White AH, Derby R, Wynne G. Epidural injections for the diagnosis and treatment of low-back pain. *Spine* 1980; 5:78.
- Benoist M, Boulu P, Hayem G. Epidural steroid injections in the management of low-back pain with radiculopathy: an update of their efficacy and safety. *Eur Spine J*. 2012; 21:204–13.
- Saal JA, Saal JS, Herzog RH. The natural history of lumbar intervertebral disc extrusions treated non-operatively. *Spine*. 1990; 15:683–86.
- Goupille P, Jayson MI, Valat JP, Freemont AJ. The role of inflammation in disk herniation-associated radiculopathy. *Semin Arthritis Rheum*. 1998;28(1):60-71.
- Hamamoto H, Miyamoto H, Doita M, Takada T, Nishida K, Kurosaka M. Capability of nondegenerated and degenerated discs in producing inflammatory agents with or without macrophage interaction. *Spine (Phila Pa 1976)*. 2012;37(3):161-167.
- Stout A. Epidural steroid injections for low back pain. *Phys Med RehabilClin N Am*. 2010;21(4):825-834.
- Pandey RA. Efficacy of Epidural Steroid Injection in Management of Lumbar Prolapsed Intervertebral Disc. A Comparison of Caudal, Transforaminal and Interlaminar Routes. *J Clin Diagn Res*. 2016 Jul; 10(7): RC05–RC11.
- Atci I, AlbayrakS, Durdag E, Ayden O. Caudal Epidural Steroid Application at Chronic Low Back and Leg Pain:

Experience of Fifty Cases and the Analysis of Pain and Satisfaction of the Cases. Journal of Neurology ResearchN Am2014;3(6):173-178.

19. Murakibhavi VG, Khemka AG. Caudal epidural steroid injection: a randomized controlled trial. Evid Based Spine Care J. 2011 Nov;2(4):19-26.