

Our experience with epidural steroid injections in the management of low back pain and sciatica

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Abstract

Background: Low back pain (LBP) and sciatica is a common clinical condition worldwide. The initial treatment of Low back pain is conservative. Epidural steroid injection (ESI) is being slowly established as a reliable mode of conservative management in many orthopaedic centres of the world. This is a preliminary report of on-going study of the use of epidural steroid injection the management of low back pain cases coming to the orthopaedic department of Government Medical College Jammu.

Methods: 150 Patients reporting with low back pain and sciatica not responding to other modes of conservative treatment were prospectively followed over a two year period. The caudal epidural steroid injections were performed, as many as three injections two week apart. The patients were assessed before and after the procedure clinically and the Level of pain, improvement in physical signs and ability to do activities of daily living were noted.

Results: 150 patients were observed for the duration of 2 years. Average duration of symptoms was for six months. After first epidural steroid injection 80% [120] of patients reported relief within first two weeks. Forty Four (44) patients required two injections and 12 patients required three injections. Twelve (12) patients reported no relief after first injection. The duration between two injections was two to three weeks. Average duration of pain relief was 17 days. At the end of three months, good results were seen in 49%, fair in 32% and bad results in 18%. Overall 69% of patients were able to do activities of daily living. Most common complaint of patients after injection was pain at the injection site. No major complications were encountered.

Conclusion: Epidural Steroid Injection is a simple, cost effective and minimally invasive mode of treatment of Low Back Pain and sciatica. It provides pain free period to enable the patient for physiotherapy which helps in early recovery.

INTRODUCTION

Low back ache (LBA) is one of the commonest presenting complaints in orthopaedics. It is an extremely common human phenomenon, a price mankind has to pay for their upright posture. It is reported in all age groups and by all sections of society. The life time incidence of LBA in western society is about 80%. It is a disabling condition and lasts for months or years. There are various causes of LBA, specific as well as non-specific. Diagnosing the exact cause requires a thorough history, knowledge of working and living conditions, clinical examination, and routine as well as special investigations. In some patients psychological evaluation is also required.

LBA treatment varies from conservative to operative modalities with varied results. Conservative treatment includes rest, analgesics, traction and sometimes spinal manipulation. Those not responding may require surgical treatment. But complete relief may not be obtained even

after surgery (failed back syndrome).

In selected patients epidural steroid injections (ESI) has been used with gratifying results. They are combination of long acting steroid and epidural anaesthetic. They provide analgesia for variable periods during which patient can go for rehabilitation exercises. The treatment of sciatica by epidural steroid injection was reported in 1953 by Lievre. It has since been used widely in many countries and all continents with varying success as reported in the United Kingdom, America, India, Australia, New Zealand, and Europe. The most dreaded complication was epidural abscess and localized infection of various forms, whereas complications such as meningitis and arachnoiditis, occurred rarely and only in subdural injections or not at all. Other rare forms such as retinal haemorrhage, myopathy and lipomatosis associated with Cushing's syndrome have also been reported.

The present paper is aimed to present our experience with

epidural steroid injections in management of low back pain and sciatica with measurable parameters (straight leg raising test, spinal flexion and extension, percentage of improvement).

RATIONALE FOR USE OF STEROIDS IN BACK PAIN

Since lumbar radicular pain may originate from inflammation of the epidural space and the nerve root, analgesic effects of corticosteroids most likely are related to the following mechanisms:

MATERIAL AND METHODS

One hundred and fifty patients (125 males and 25 females) of LBA with radiculopathy not responding to conservative treatment referred to the Department of Orthopaedics, GMC Jammu were prospectively followed over a two year period from May 2008 to May 2010.

Inclusion criteria for this study were - (i) patients with LBA and Sciatica not responding to conservative treatment, lasting less than twelve months

Exclusion criteria were - i) motor deficit (ii) prior lumbar disc surgery (iii) patients who were younger than eighteen years of age or older than seventy years of age;(iv) were pregnant (v) had cauda equina syndrome,(vi) a far-lateral disc herniation(vii), multilevel symptomatic disc herniation, or(ix) a recurrent disc herniation.

Patients meeting the inclusion criteria and without any exclusion criteria were included in the study. All patients had preoperative thorough history, physical examination, measurements, plain radiological examination performed, and for the indicated, haematological tests as well. The predominant nerve root involved giving rise to sciatica symptoms was determined on clinical evidence and plain radiological findings. Grading was recorded for pre-operative pain and measurements taken for ipsi-lateral and contra-lateral straight leg raising tests, and spinal motion (flexion and extension). Symptom-wise, preoperative pain was classified into mild (Grade 1, 0 cases), moderate (Grade 2, 96 cases = 64 %), and severe (Grade 3, 54 cases = 36 %).

The patient was placed in prone position with the head elevated. Under full aseptic technique, the sacral hiatus was located by surface anatomy. Fluoroscope was not used in any case. Methyl prednisolone (40 mg ,2 cc) was taken along with 2cc of 2% xylocaine and diluted in normal saline to make a total of 20cc and injected in epidural space through

sacral hiatus. The patient was allowed to lie in a lateral position on the side of sciatic radiation for a few moments and then transferred back to the ward in a supine position. The patient was advised to rest, lying for a few hours in the hospital before discharge or go home during which period the patients were continuously observed for any possible complications. This was also to let the steroid settle near the inflamed site. The caudal epidural steroid injections were performed, as many as three injections two weeks apart. If a patient subjectively reported a decrease in pain within two week after a single injection, no more injections were administered. If the patient did not have improvement within two to three week period, a second (or third) injection was performed. The dose of the corticosteroid (Methylprednisolone) was 40 mg.

FOLLOW UP

One week post-operatively, the patients were reviewed and the gradings were recorded for post-operative pain, parasthesia, and measurements taken for ipsi-lateral and contra-lateral straight leg raising tests, and spinal motion (flexion and extension) for comparison and analysis. Pain and parasthesia improvements expressed in percentages, as subjectively judged by patients, and were also noted. The patients were first reviewed after one to two weeks and then at 1, 3 & 6 months.

RESULTS

The present study was conducted in the Department of orthopaedics, Government Medical College, Jammu over a period of two years from May 2008 to May 2010 to evaluate the efficacy of epidural steroid injection (ESI) in the management of LBP and sciatica

One hundred and fifty patients (125 males and 25 females) were selected from Orthopaedic OPD and ESI was done. After two years of follow up of each case, results of study were compiled and following observations were recorded. The mean age of patients was 37.9 yrs (range 20 - 65 yrs) table 1. The average duration of symptoms was for 06 months (range, 3 days to 4years). The commonest complaint was LBA (83%). Among the sciatica patients, the pre-dominant nerve root involved was the L5 root in 80% of cases. S1 root was involved in 12% and in determinant in 08% of cases. Among sciatica patients SLR positive patients were 40%.

ANALYSIS

Duration between Injections: Average duration between injections was 2 to 3 weeks.

Pain Relief (table 3):

The results were divided into 4 groups. 130 cases (86.66 %) were in the good and excellent categories. After first epidural steroid injection 80% [120] of patients reported relief within first two weeks. Forty Four (44) patients required two injections and 12 patients required three injections. Twelve patients reported no relief after first injection. Average duration of pain relief was 17days. Overall 69% of patients were able to do activities of daily living.

Spinal motion improvements. Increase of spinal flexion was recorded from 0° to 60°, with a mean Increase of 28°. Extension increase ranged from 0° to 25°, with a mean increase of 10°.

Post- operative ipsi-lateral (affected side) and contra-lateral SLR increase. The results are presented in Tables 4 and 5. The percentage of increase of ipsi-lateral SLR was 25% (22°). The mean increase of contra-lateral SLR was 8.2% (6°).

Complications: No complications were seen except local pain over injection site in 9 patients. Some had temporary headaches which responded to bed rest, oral fluids and paracetamol.

Duration Of symptoms. In general, patients who have had symptoms for less than 3 months showed response rates of 86%. When patients have had radiculopathy symptoms for less than 6 months, response decreases to approximately 64%. Response decreased to 50% in patients who have had symptoms for over 1 year. Patients with symptoms of shorter duration have more sustained relief than those with chronic pain.

Figure 1

Table 1: Population study demographics

Years	Male	Female	Total
< 30yrs	23	7	30
31-40 yrs	60	14	74
41-50 yrs	30	10	40
51-60 yrs	3	1	04
> 60 yrs	2	0	02
Total	125	25	150

Figure 2

Table 2: occupation

Sedentary	65
Manual labourer	70
House work	15

Figure 3

Table 3: Postoperative pain improvement

Improvement in groups	% of pain Improvement	Number of cases	% of patient Population
Group 1 (Excellent)	76-100%	108	72%
Group 2 (Good)	51-75%	22	14.66%
Group 3 (Moderate)	26-50%	12	8%
Group 4 (Poor)	0-25%	08	5.34%
Total		150	100%

Figure 4

Table4: Preoperative ipsilateral SLR test status

SLR range in degrees	Number of patients	% of total
SLR 15°-30°	12	20%
SLR 35°-60°	32	53.34%
SLR 65°-90°	16	26.66%

Figure 5

Table5: Postoperative improvement in straight leg raising test in all groups

	Ipsilateral SLR increase in degrees	Ipsilateral SLR increase in range in %	Contralateral SLR increase in degrees	Contralateral SLR increase in range in %
Range	0°-60°	0-70%	0°-60°	0-62%
Mean	22°	25%	6°	8.2%

DISCUSSION

The treatment of LBP has been a matter of controversy. Since the cause of LBP is multifactorial, the modality of treatment varies accordingly. Mild cases of LBP improve with rest alone without medication while some requires analgesics. Deyo et al found two days of bed rest as optimum duration without any difference in clinical outcome on long term follow up. Exercises are essential for rehabilitation of LBP patients. It is recommended according to patient’s tolerance and need. Use of NSAID for pain relief is controversial, as it does not treat the cause; it has lots of side effects and abuse potential. It is recommended for shorter duration. Short-term corticosteroids can be given with good results. Antidepressants have also shown good results. There are other modes of treatment like transcutaneous electrical nerve stimulation (TENS), traction and ultrasound. The scientific efficacy of many of these

treatment modalities is not proved. Surgery is indicated in cases with definite surgically correctable pathological lesions. The failure rate is as high as 30%. The incidence of persistent back pain after surgery was found to be inversely proportional to the degree of herniation. Hence the patients with small herniation are not good candidates for surgery. Historically the first published report of therapeutic spinal injection for the treatment of LBP & sciatica dates back to 1901. Cocaine was the first drug tried in LBP. Then procaine, Ringer's solution and saline were used. But the first reported use of epidural steroid was in 1952 by Robecchi and Capra. They used hydrocortisone as periradicular injection in the first sacral root. Later on various researchers used depomedrol for injection and reported better results compared to procaine and other anaesthetic agents. Beliveaus showed that depomedrol was more effective in long standing back pain and sciatica. Recent research has shown the role of proinflammatory chemicals in patho-physiology of LBP. The release of phospholipase A2 from damaged nucleus pulposus is supposed to produce pain. Saal et al showed high levels of phospholipase A2 in human discs compared to other human tissues. Burke et al. reported high levels of interleukin-6 (IL-6), interleukine-8 (IL-8), & prostaglandin E2 (PGE2) in the disc of the patients undergoing fusion for discogenic pain. Leukotriene B4 and thromboxane B2 also has been discovered within herniated human discs after surgery. These inflammatory substances are supposed to produce radicular pain. Proposed hypothesis of action of epidural steroids are three.

Several studies have shown that ESI is effective in LBP. According to Bogduk, out of 40 studies on more than 4000 patients on lumbar and caudal steroid injections, 36 recommended in favour of the use of ESI in lumbosacral pain. In 1973, Dilke & colleagues published a double blind, controlled and randomized prospective study in 100 patients. Their overall success rate was 45%. Other authors reported success rates ranging from 63% to 80%. ESI is also endorsed by the North American Spine Society and the Agency for Health care Policy and Research as an integral part of non-surgical management of radicular pain from lumbar spine disorders. As such the reported success rate in the literatures varies from 20% to 100%. The average success rate was 60% to 75%. The long term success rate at 6 months was 30% to 40% in most studies.

In our study we found 69% success rate at 2 years. There are several factors for varied results like patient selection,

technique of injection, dosage of steroid & follow up. After all precautions, the failure rate in other studies was 25% to 30%. White & colleagues prospectively studied 300 patients and reported good results in early periods. The effect of ESI was found to decrease with time. They reported 82% pain relief for one day, 50% for two weeks & 16% for two months. This therapeutic decay prompted many physicians to recommend multiple injections. The local effect of steroids has been shown to last at least 3 weeks at a therapeutic level. The acceptable time interval between two injections is still debatable but some studies have shown that 7-10 days interval is appropriate. In our study the average interval between injections was two to three weeks. Epidural injections are a relatively safe procedure as total complications in most series were 5%. There have been reports of epidural abscess, epidural hematoma, and duro-cutaneous fistula, Cushing syndrome, bacterial meningitis and post-dural puncture headache. None of these were seen in our study. Only few of our patients reported with local pain over the injection site and headache, which subsided without treatment.

Contraindications to ESI are infection at the injection site, systemic infection, bleeding diathesis, uncontrolled diabetes, congestive heart failure and patients' unwillingness.

CONCLUSION

ESI is a safe, effective, & economical treatment modality for LBP. It reduces the period of hospitalization, analgesic intake & facilitates the institution of early rehabilitative programs. We recommend ESI as a conservative mode of treatment of back pain with or without radicular symptoms with no motor deficit not responding to other modes of conservative treatment.

References

1. Hult L: The Munkfors investigation. *Acta Ortho Scand Suppl* 1954; 16:1.
2. Keith D William and Ashley L. Park- Low back pain and disorders of intervertebral discs. In: S.Terry Canale, editor - *Campbell's operative orthopaedics*. Vol-II. 10th ed. Mosby, 2003:1961-2003.
3. WHO Technical Report Series 919, Table-6, 2003:38-39.
4. Glenn R. Buttermann - *Treatment of lumbar disc herniation: epidural steroid injection compared*
5. Lievre JA, Bloch-Michel H, Attali P. L'injection transacrée: etude clinique et radiologique. *Bull Mem Soc Méd Hôp Paris* 1957; 73:1110-7.
6. Bogduk N. Spine update — Epidural Steroids. *Spine* 1995;7:845-8.
7. Dilke TF, Burry HC, Grahame R. Extradural corticosteroid injection in management of lumbar nerve root compression. *Br*

- Med J 1973 Jun 16; 2 (867): 635–7.
8. Carette S, Leclaire R, Marcoux S, Morin F, Blaise GA, St.-Pierre A, Truchon R, Parent F, Levesque J, Bergeron V, Montminy, P, Blanchette C. Epidural Corticosteroid Injections for Sciatica Due to Herniated Nucleus Pulposus. *N Eng J Med* 1997;336:1634–40
 9. Cuckler JM, Bernini PA, Weisel SW, Booth JR Jr, Rothman RH, Pickens GT. The use of epidural steroids in the treatment of lumbar radicular pain. *J Bone Joint Surg.*, 67A63–6, 1986.
 10. Feffer HL. Regional use of steroids in the management of lumbar intervertebral disc disease. *Orth Clin of N Am* 1975 6 (1):249–253.
 11. Mam MK. Results of epidural injection of local anaesthetic and corticosteroid in patients with lumbosciatic pain. *J Indian Med Assoc* 1995 Jan;93 (1):17–8.
 12. Corrigan AB, Carr G, Tugwell S. Intraspinal corticosteroid injections. *Med J Aust* 1982;1:224–5.
 13. National Health and Medical Research Council. Epidural use of steroids in the management of back pain. Canberra: Commonwealth of Australia, National Health and Medical Research Council, 1994.
 14. Ryan MD, Taylor TK. Management of lumbar nerve root pain by intrathecal and epidural injections of depot methylprednisolone acetate. *Med J Aust.* 1981 Nov 14; 2 (10): 532–4.
 15. Hickey RF. Outpatient epidural steroid injections for low back pain and lumbosacral radiculopathy. *NZ Med J* 1987 Sep 23; 100 (832): 594–6.
 16. Koes BW, Scholten RJ, Mens JM, Bouter LM. Efficacy of epidural steroid injections for low-back pain and sciatica: a systematic review of randomized clinical trials. *Pain* 1995 Dec;63 (3):279–288.
 17. Bromage PR. Extradural abscesses. *Comment. Br J Anaesth* 1993 Apr;70 (4): 387–8.
 18. Chan ST, Leung S. Spinal epidural abscess following steroid injection for sciatica. *Case report. Spine* 1989 Jan;14 (1):106–8.
 19. Goucke CR, Graziotti P. Extradural abscess following local anaesthetic and steroid injection for chronic low back pain. *Br J Anaesth* 1990 Sep;65 (3):427–9.
 20. Knight JW, Cordingley JJ, Palazzo MG. Epidural abscess following epidural steroid and local anaesthetic injection. *Anaesthesia* 1997 Jun;52 (6):576–8.
 21. Mamourian AC, Dickman CA, Drayer BP, Sonntag VK. Spinal epidural abscess: three cases following spinal epidural injection demonstrated with magnetic resonance imaging. *Anaesthesiology.* 1993 Jan 78 (1):2047.
 22. Bogduk N. Spine update — Epidural Steroids. *Spine* 1995;7:845–8.
 23. Nelson DA. Dangers from methylprednisolone acetate therapy by Intraspinal injection. *Comments in: Arch Neurol* 1989 Jul;46 (7): 718–91, 719–2, 721–2, 1989 Nov;46 (11):1167–8.
 25. Johnson A, Ryan MD, Roche J. Depomedrol and myelography arachnoiditis. *Med J Aust.* 1991 July 1, 155:18–20.
 26. Latham JM, Fraser RD, Moore RJ, Blumbergs PC, Bogduk N. The pathologic effects of intrathecal betamethasone. *Spine* 1997 Jul 15;22 (14):1558–1562.
 27. Roche J. Steroid-induced arachnoiditis. *Med J Aust,* 1984 Mar 3, 281–4.
 28. Bradley KC, Corrigan AB, Ingpen ML. Letter to editor. *Med J Aust.* 1982 Jan 9:11–12.
 29. Corrigan AB, Carr G, Tugwell S. Intraspinal corticosteroid injections. *Med J Aust* 1982;1:224–5.
 30. Ryan MD, Taylor TK. Management of lumbar nerve root pain by intrathecal and epidural injections of depot methylprednisolone acetate. *Med J Aust.* 1981 Nov 14; 2 (10): 532–4.
 31. Katz JA, Lukin R, Bridenbaugh PO, Gunzenhauser L. Subdural Intracranial air: An unusual course of headache after epidural injection. *Anaesthesiology.* 1991 Mar; 74 (3): 615–8.
 32. Kepes ER, Duncalf D. Treatment of backache with spinal injections of local anaesthetics, spinal and systemic steroids. A review. *Pain* 1985 22:33–47.
 33. National Health and Medical Research Council. Epidural use of steroids in the management of back pain. Canberra: Commonwealth of Australia, National Health and Medical Research Council, 1994.
 34. Cicala RS, Turner R, Moran E, Henley R, Wong R, Evans J. Methylprednisolone acetate does not cause inflammatory changes in the epidural space. *Anaesthesiology* 1990 Mar; 72 (3): 556–8.
 35. Delaney TJ, Rowling son JC, Carron H, Butler A. Epidural steroid effects on nerves and meninges. *Anesth-Analg* 1980 Aug; 59 (8): 610–4.
 36. Maxwell DC. Letter to editor. *Med J Aust.* 1991 Mar 18 154:428–9.
 37. Boonen S, Van Distel G, Westhovens R, Dequeker J. Steroid myopathy induced by epidural triamcinolone injection. *Br J Rheumatol* 1995 Apr; 34 (4):385–6
 38. Kushner FH, Olson JC. Retinal hemorrhage as a consequence of epidural steroid injection. *Arch Ophthalmol* 1995 Mar;113 (3):309–313.
 39. Roy-Camille R, Mazel C, Husson JL, Saillant G. Symptomatic spinal epidural lipomatosis induced by a long-term steroid treatment. Review of the literature and report of two additional cases. *Spine* 1991 Dec. 16 (12): 1365–71.

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