Original article:

Use of epidural steroids in cases of low back pain and sciatica: A prospective observational study.

Dr. Amol Prakash Singam, Dr. Vinay Ramesh Dhakate, Dr. Saurabh Shivhar Yelurkar, Dr. Satish Narayan Gosavi

J.N. Medical College, DMIMS(DU), Sawngi(Meghe), Wardha, Maharashtra, India, 442004.

Corresponding Author: Dr Amol Prakash Singam

Abstract:

Introduction: Our aim was to determine the effectiveness of epidural corticosteroid injection in patients having low back pain and sciatica. Low back pain and sciatica are common clinical conditions. The initial treatment of both the conditions is conservative. Epidural steroid injection is being established as a reliable mode of conservative management.

Methods: In our study 67 patients were reported with low back pain and sciatica not responding to other modes of conservative management. We injected Methylprednisolone 80 mg diluted in 10 ml of normal saline in L₃-L₄ or L₄-L₅ space. The functional status of the patient and the severity of pain were evaluated before and after injection and during the follow-up period, using Oswestry Disability Index (ODI) and Visual Analogue Score (VAS).

Results: Our 67 patients received the epidural steroid injections and only 51 patients came for regular follow up till next six months. Among them 31 were male and 20 were female patients. The functional status and pain response of the patients were improved significantly during our follow-up period (p < 0.05). The success rate of this study was 77%. No major complications were encountered.

Conclusion: The Epidural Steroid Injection (ESI) is a simple, safe, effective and minimally invasive modality for the management of Low Back Pain (LBP) and Sciatica with overall good results.

Keywords: Epidural Steroid Injection, Low Back Pain

Introduction

Low back pain and associated sciatica are considered to be a major health problem in modern societies, they may cause significant disability and there are frequent visits to hospitals. In western society the life time incidence of LBP is around 80%. It is such a disabling condition and lasting for months or years. There is an estimated evidence of 15% to 20% cases of back pain in adults during a year. Low back pain affects almost all the adults. It is a major cause of disability in the adult working population causing economic burden on society. Risk factors for developing spine pain may be physical, socio-economical, poor medical health, psychological state, occupational and environmental. These all factors contribute to the risk for experiencing the back pain. Some patients may require psychological evaluation. The treatment varies from conservative to surgical with varied results. Rest, analgesics, traction and sometimes spinal manipulation are conservative modes of management. Those not responding to conservative means may require surgery for LBP. Even after surgery there may not be complete relief (failed back syndrome). In selected patients epidural steroid injections (ESI) has been used with satisfying results for physicians and patients both. ESI provide analgesia for longer periods following which patient can go for physiotherapy. The purpose of our study
was to observe the effect of epidural steroid injection in cases of LBP and sciatica on Indian population.

**Materials and Methods**

This was a prospective observational study, conducted at Acharya Vinoba Bhave Rural Hospital, Sawangi (Meghe), Wardha in central India over a period of one year. This study was conducted between January 2012 and December 2012. During this period sixty seven patients aged 20 to 60 years presented to the hospital and registered with complaints of low back pain and/or with a clinical diagnosis of unilateral sciatica and in whom conservative treatment with Non-steroidal anti-inflammatory drugs (NSAIDs), antidepressant, oral steroids and traction of at least 6 weeks had failed to give relief to patients, these patients were included in our study. Sciatica is defined as leg pain radiating below the knee, reduced straight leg raising (SLR), and a positive sciatic nerve stretch test. The patients with motor deficit, prior lumbar disc surgery, diabetes, bleeding disorder, and patient not willing to take part in study were excluded from study.

Pre-injection Oswestry Disability Index (Version 2) and Visual Analogue Scale (VAS) were calculated for each patient. The Oswestry Disability Index (ODI) is considered as a "gold standard" for low back pain as functional outcome tools. It is a widely used, ten-question paper and pencil measure of disability resulting from low back pain. Our patients were asked to answer the Oswestry Disability Index questionnaire. The score in this questionnaire ranges from 0 to 100 with 0% to 20% shows minimal disability, 21%-40%; moderate disability, 41%-60%; severe disability, 61%-80%; crippled and 81%-100% shows bed ridden patients with LBP. Patients rated their pain on Visual Analogue Scale (VAS) of 0 to 10 with 0 representing no pain and 10 the severest pain they had ever experienced. The patients with Oswestry Disability Index of more than 20% or pain score of 3 or more were included. The study was started after due approval from the institutional Ethics Committee. Relevant history, physical examination and X-ray lumbosacral spine antero-posterior & lateral view were taken. The written informed consent of patient was recorded. Routine laboratory investigations like Hb%, total and differential leukocyte count, platelet count, erythrocyte sedimentation rate, bleeding time and clotting time were done. Random blood sugar was also done to rule out any subclinical diabetes.

The procedure of injection was performed in the operation theatre. Then ESI was given by trained anaesthetist. A 18 gauge Tuohy epidural needle was inserted into the epidural space in L₃ –L₄ or L₄-L₅ space with the bevel upward and stylet in position. The epidural space was identified by loss of resistance to air technique. 80 mg of Methylprednisolone was diluted in 10 ml of distill water for injection and injected in epidural space. After the procedure hemodynamic variables were monitored and recorded every 5 min for 30 min in operation theatre. The patients were advised to lie supine or on the side of sciatic radiation for 24 hours after injection, this was done to let the steroid settle near the inflamed site. During this period they were observed for any possible complications. The amount of pain, radiation and subjective improvement was noted after 24 hours. Each patient was re-evaluated after 1 week of initial injection. Patients with post-injection Oswestry Disability Index ≥45% or pain score≥5 at 1 week were repeated with ESI. No more than two injections were given to any patient. Subsequently, all patients were evaluated at 1 week,
1, 3 and 6 months to determine the efficacy of injections.

The data analysis was done by using the SPSS 11.0 software. Paired t- test was applied to compare changes in functional status and pain intensity. p value of <0.05 was considered as significant.

Results
A total of Sixty seven patients received epidural steroid injection, among them four patients did not come for follow up for six months, and twelve patients underwent surgery for herniated lumbar disc. After excluding 16 patients 51 patients were studied, in those 51 patients the mean age was 48.02± 10.63 yrs. Among these, 30(58.82%) were male and 21(41.18%) were female patients. Twenty five (49.01%) patients had sciatica either of the left or right side while twenty six (51.99%) patients had Low Back Pain.

![Fig. 1. ODI of patient after ESI during follow up visits (Functional Status).](image1)

![Fig. 2. VAS of patient after ESI during follow up visits (Pain response).](image2)
The mean pre-injection Oswestry Disability Index was 58.4% and pain score was 7.83 on Visual Analogue Scale. During all follow up visits there was significant improvement in Functional status of the patients as shown in Fig. 1. Similarly there was significant reduction in pain intensity in all follow up visits as shown in Fig. 2. For 20(29.85%) patients out of 67 patients we had to repeat injection at 1st week, out of which 8(11.94%) patients had improvement of Oswestry Disability Index (by 10.8%) and pain score( by 1.5)while 12(19.67%) patients(8 male,4 female) showed no improvement of Oswestry Disability Index(mean 59%) and pain score(mean 5.9) at all, they underwent surgery. There was no gross difference in gender response to methylprednisolone injections. The pain scores and Oswestry Disability Index also did not differ significantly between patient receiving single injection and those who received second injection after failure to achieve desired response from the first injection. No patients received a third injection. No major complications were observed during EPI and after it.

Discussion

The treatment of LBP has been a matter of controversy. Since the cause of LBP is multifactorial, the modality of treatment varies from case to case. Mild cases of LBP improve with rest alone without medication while some requires analgesics. Deyo et al found that two days of bed rest is sufficient rather than longer period without any perceptible difference in clinical outcome. Exercises are essential and recommended according to tolerance of patient for rehabilitation of LBP patients. The use of NSAIDs is controversial, as it does not treat the root cause. Due to lots of side effects and abuse potential it can be recommended only for shorter duration. Short-term corticosteroids and antidepressants may also produce reduction in pain. There are other modes of treatment like transcutaneous electrical nerve stimulation (TENS), traction and ultrasound. The scientific approach of these different treatment modalities is not yet been proved. Surgery is indicated in cases with definite surgically correctable pathological lesions, even after surgery the failure rate is as high as 30%.

Epidural steroid injections have been used for decades in the management of low back pain. It is minimally invasive and effective treatment modality. The literature reveals that first time use of epidural steroid was done in 1952 by Robecchi and Capra and is still an integral part of conservative management of low back and radiating pain, hydrocortisone was injected in first sacral root by them. After them many physicians used injection methylprednisolone (Depomedrol) and reported the better outcome. The efficacy of depomedrol was more effective in chronic back pain and sciatica. New researches have shown the role of proinflammatory chemicals in patho-physiology of LBP. The phospholipase A2 from damaged nucleus pulposus is main cause and supposed to produce pain. According to Saal et al there are high levels of phospholipase A2 in human discs compared to any other tissue in the body. A study done by Burke et al. reported that there are high levels of interleukin-6 (IL-6), IL-8, & prostaglandin E2 (PGE2) in the disc of the patients who were gone for surgery of fusion for discogenic pain;Leukotriene B4 and thromboxane B2 also has been observed in patients with LBP. There are many studies showing effectiveness of ESI for management of LBP and sciatica. According to Bogduk N, out of 40 studies over more than 4000 patients on lumbar and caudal steroid injections for
management of LBP, 36 studies recommended in favor of the use of ESI in LBP and Sciatica.\textsuperscript{16} Similarly, Koes et al reviewed 12 randomised controlled trials to assess the efficacy of epidural steroid injections for management of low-back pain and found that it is effective in six studies.\textsuperscript{17} Helliwell et al. also showed us that ESI significantly improved the LBP.\textsuperscript{18} In our study Oswestry disability index (ODI) was used for the assessment low back pain. It is based on a patient’s subjective impression on his or her own state of disability.\textsuperscript{5,6} The ODI was decreased by around 24% by first week and by around 40% by the end of six month following epidural steroid injection. For assessment of pain we used Visual Analogue Scale (VAS)\textsuperscript{7} of 0 to 10 with 0 representing no pain and 10 the worst pain they had ever experienced. Similarly VAS score was decreased by 37% in the first week and by 49% of initial at the end of six months. This result indicates that the functional status of patients and pain intensity was significantly improved in all follow up visits. Our results are comparable with the study done by Baral et al.\textsuperscript{19}

In our study we used methylprednisolone for the management of low back pain. Our study showed significant relieve of the symptoms of LBP as well as improvement in the functional status of the patients. Proposed hypothesis of action of epidurally injected steroids are.

1) They inhibit the neuropeptide synthesis and suppress inflammation.
2) They stabilize the membrane and have some anaesthetic action, and it reduces sensory symptoms.
3) They inhibits transmission in unmyelinated C fibres, which are the main nociceptive pathway.\textsuperscript{20}

Thus our study supports the findings of the study done by Belivesus P, he also reported that epidurally injected methyl prednisolone was more effective in long standing back pain and sciatica.\textsuperscript{13}

In our study we found 12 patients did not improve with ESI and undergone surgery, 4 patients did not come for follow up. Considering those who didn’t come for follow-up as failures, the success rate was 77%. Our findings support the studies done by Swerdlow et al and Winnie et al. They reported the success rates ranging from 63% to 80%.\textsuperscript{21,22} According to a double blind, controlled and randomized prospective study in 100 patients, published by Dilke et al overall success rate of ESI was 45%.\textsuperscript{23}

In our study we followed patients only for six months. With references to other studies done by many researchers the patients were followed after ESI for periods ranging from weeks to one year, showed to be beneficial.\textsuperscript{24-26} Our study offers encouraging results. However, we feel that with a larger case series, a longer follow up, randomized controlled trials and refinement of the procedure is needed to draw a fair conclusion with regards to the efficacy of this treatment modality.

**Conclusion**

Epidural steroid injection is fairly safe, effective, minimally invasive, and economical, lesser or no side effects. Complications are rare. It improves the functional status and decreases the severity of pain. Based upon the results of our study we can conclude that epidurally administered steroid injection is an effective modality of treatment in sciatica and LBP with overall good results.
References
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