

**Original article:**

**Efficacy of Epidural Steroid Injections in Management of Chronic Low Back Pain.**

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**ABSTRACT:**

**Introduction:** Low back pain is most common complaint of young adults in case of herniated disc. Incidence is high in our country due to difficult working and living environment. Most commonly used initial treatment modality is simple, effective epidural steroid injection. The aim of this study is to assess the effectiveness of epidural steroid injection in low back pain.

**Material and Method:** This is prospective observational study. It was carried on the patients presenting with low back pain to pain clinic not responding to conservational management and had MRI proven lumbar disc prolapsed at different level. Injection methyl prednisolone 80 mg with 2ml of 0.5% bupivacaine was diluted in 8ml of normal saline and injected into the lumbar epidural space. Fifty six patients received epidural steroid injection, among them three patients did not- come for follow up for six months and six patients required surgery. The remaining forty seven patients were analyzed, among them 27 (55.44%) were male and 20 (42.55%) female. The functional status and pain response of patients was improved significantly during the follow up period. The success rate of study was 83.92 %. No complications were occurred.

**Conclusion:** Epidural steroid injection for lumbar radicular pain is an Effective method of treatment.

**Key words:** low back pain, epidural steroid injection, herniated lumbar disc.

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**INTRODUCTION:**

Low Back Pain (LBP) and sciatica continue to be a leading cause of disability. Its life time incidence in the United States is 80%.<sup>1</sup>The data of our country is not available but the prevalence is high because of difficult working and living environment. This is a disabling condition of young adults and is the most common cause of limitation of physical activity<sup>1</sup>. The conventional wisdom that in most cases the pain will resolve on its own within a few weeks is true, but recent evidence indicates that the relief from “self-healing” is followed by a significant incidence of recurrence, usually in less than a year. It is an

unfortunate fact that symptoms result from degenerative changes in the spine – an ongoing process that has no cure.

Lumbar disc herniation seems to be one of the most frequent causes of LBP, nevertheless it is well known that many patients, complaining of LBP as well as of radiating leg pain suggesting sciatica, did not show lumbar disc herniation in magnetic resonance imaging (MRI) and Computed Tomography<sup>2</sup>. There is emerging evidence suggesting that this “paradox” must be probably attributed to the fact that nerve root compression is not sufficient by itself to cause nerve root pain<sup>3</sup>, since painful radiculopathy may be the end-result of a local chemical contribution from injured tissue<sup>4</sup>. Treating patients - suffering from LBP can also be challenging and this is probably why so many treatment methods (ranging from conservative measures to operations) have been introduced and are supported by the literature<sup>2</sup>.

Although the actual mechanism of action is not fully known, there is evidence that corticosteroids evidence that corticosteroids achieve pain relief by inhibition of pro-inflammatory mediators (e.g. neural peptides, phospholipase A, acid hydrolases, histamine, and kinin) and by causing a reversible local anesthetic effect (decreased sensitivity of nerve roots to irritants).<sup>5,6</sup>

The treatments used for this problem may be categorized as conservative management, epidural steroid injection, and surgery.<sup>7,8</sup> Epidural steroid injection (ESI) is a nonsurgical treatment for managing for low back and radicular pain caused by herniated lumbar disc. The low back pain of mechanical origin, accompanied by signs and symptoms of nerve-root irritation, respond to epidural steroid injection with gratifying results, It relieve pain, improve function, and reduce the need for surgical intervention. Therefore, the long acting epidural steroid injection has been widely used and slowly established as a reliable mode of minimally invasive treatment modality in many orthopaedic centres of the world. It has been shown to provide analgesia for variable periods.<sup>9,10</sup>

The purpose of this study was to assess the effectiveness of epidural steroid injection for low back and radicular pain.

#### **MATERIAL AND METHOD:**

This is a prospective observational study, conducted over a period of one and half year, from January 2011 to July 2012. During this period sixty patients presented to the hospital with complain of low back pain radiating to legs. Patients having back pain not responding to conservative treatment (i.e. Non-steroidal anti-inflammatory drugs- NSAIDs), antidepressant, oral steroids, transcutaneous electrical nerve stimulation (TENS), traction, and ultrasound and MRI proven lumbar disc prolapsed at different level were included in the study.

Exclusion criteria included motor deficit, prior lumbar disc surgery, diabetes, bleeding disorder, and patient refusal.

This study was approved by the hospital research committee. Written and informed consent was obtained from each patient. Then thorough history was taken and clinical examination was done. The findings of straight leg raising test (SLR), motor and sensory deficit, and deep tendon reflexes (DTR) were noted. Routine laboratory investigations including prothrombin time, bleeding time, clotting time, platelets random blood sugar was done. The ESI was given by trained anaesthesiologist in operation theatre. During the procedure, peripheral venous access was secured in all the patients with 20 G intravenous cannula on the dorsum of hand. Patients were connected to the patient monitor for monitoring ECG, heart rate, non-invasive blood pressure (NIBP), and pulse oximetry. All the patient were kept in sitting position. Cleaning and draping of the part was done under aseptic precaution.

The disc level for ESI was located by surface anatomy. Using strict aseptic technique, two millilitres of 1% lidocaine was infiltrating to the skin and subcutaneous tissue for surface anaesthesia. An 18 gauge toughy epidural needle was inserted into the epidural space of the herniated lumbar disc through trans-lumbar route with the bevel upward and stylet in position. The epidural space was identified by loss of resistance to air technique.

Injection methylprednisolone 80 mg (Depo-Medrol® by pfizer) and 2ml of 0.5% bupivacaine (Sensorcaine® by Asmira) was diluted in 8 ml of normal saline and injected into the lumbar epidural space. After the procedure, patients were advised to lie supine in case of bilateral symptoms and to lie on right or left lateral position in case of only right or left sided symptoms respectively. During this period they were observed for any possible complications. The patients were first reviewed after one week, and then further follow up was carried out at one month & six months after the epidural steroid injection. During follow up, the Oswestry disability index (ODI) and visual analog score (VAS) were used to evaluate the response of treatment. The ODI was employed to quantitate the level of functional disability.

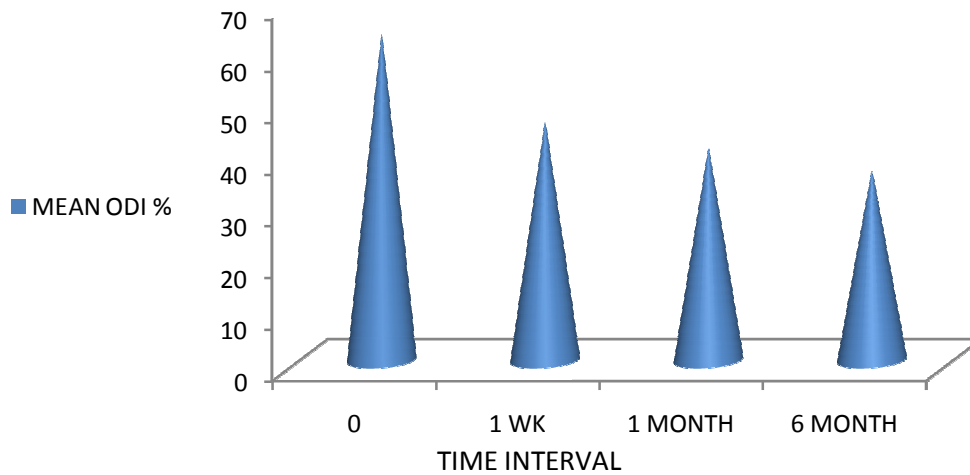
It consist of ten questions, each with six alternative scores 0–5.<sup>11,12</sup> The sum of the scores was expressed as a percentage. A change of more than 10 points or a change of a minimum of 20% was considered a significant clinical improvement. VAS score was used for assessment of current back and lower extremity pain, ranging from 0 (no pain) to 10 (worst pain possible). If a patient subjectively reported a decrease in pain within one week after a single injection, no more injections were administered. If the patient didn't have improvement within a week, a second injection was performed. Patients with low back pain not responding to second dose of ESI were considered for surgery. If the patient didn't have subjective improvement even after a second dose of ESI considered as failure of ESI. The success rate of epidural steroid injection was presented as percentage. All patients were advised to take mild analgesics (Tab.

Diclofenac 75 mg per oral eight hourly for 1 day) during the post-injection period. No special exercise program or other physical therapy was employed after the injections.

**RESULT:**

Out of sixty patients, four patients were excluded from the study because of patient not meeting the inclusion criteria. Fifty six patients received epidural steroid injection, among them three patients did not come for follow up for six months and six patients required surgery. The remaining forty seven patients were analyzed, among them 27 (55.44%) were male and 20 (42.55%) female. The mean age of patients was 43.52(±10.42) years. The commonest intervertebral disc Involved was L4-5 (38%) followed by L5-S (20%) in single level PIVD. However, in multi-level disc prolapsed L4-5, L5-S1 (33%) was commonest level. Single level disc prolapse was seen in 30 patients (63.82%) and multi level disc prolapse in 17 patients (36.17%).

Significant Functional status improvement was observed in all follow up visits, which was shown in Fig.1.



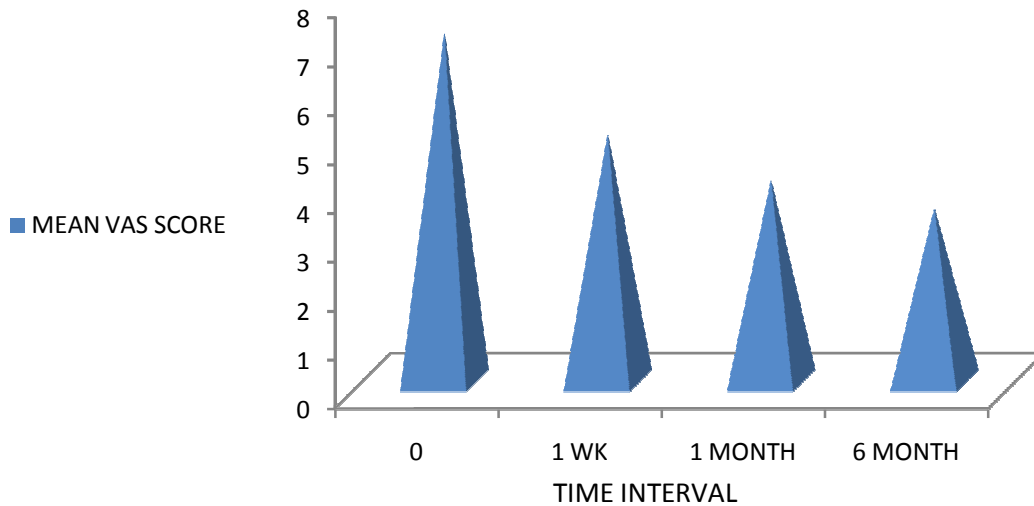
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Similarly significant reduction in pain intensity was observed in all follow up visits as shown in Fig. 2.



Six patients (10.71%) showed no improvement of pain even after two doses of ESI. These patients underwent surgery. All of them had multi level disc prolapse. Three patients did not come for follow up. So the success rate of this study was 83.92%. No complication was observed except local pain over injection site in three patients (5.3%).

#### DISCUSSION:

Epidural steroid injections have been used for decades in the management of low back pain. It is minimally invasive and effective treatment modality in many orthopaedic centres. The first reported use of epidural steroid was in 1952 by Robecchi and Capra<sup>13</sup> and is still an integral part of non-surgical management of low back and radiating pain. They used hydrocortisone in the first sacral root. Later on various researchers were used injection methylprednisolone (Depomedrol) and reported better results. Epidural steroid is found to be beneficial in PIVD, spinal canal stenosis and degenerative disc disease, - where as in non specific back pain, facet syndrome, metastatic and metabolic causes; it is found to have no benefit.<sup>14,15</sup>

Epidural steroid injection following epidurography (fluoroscopic guidance) is found to be superior to the blind technique.<sup>16</sup> It is found that in 30 – 70 % of the cases there is inappropriate placement of the drug during epidural steroid injection even with the hands of experienced performer.<sup>16</sup>

Though the short term effect (i.e. < 6 weeks) is superior in the transforaminal method than the interlaminar or interspinous technique of epidural steroid deposition, the long term outcome is found to be similar.<sup>17</sup> There are several types of steroid being used for epidural steroid like hydrocortisone, betamethasone, triamcinolone and methylprednisolone. However different studies have failed to prove

superiority of one steroid above the other.<sup>18,19,20</sup> We are using methylprednisolone 80 mg as it has relatively long duration of action.<sup>20</sup>

In Bogduk series, out of 40 studies more than 4000 patients on lumbar and caudal steroid injections, 36 studies recommended in favour of the use of ESI in lumbosacral pain.<sup>21</sup> Similarly, Koes *et al* review the 12 randomised controlled trials to assess the efficacy of epidural steroid injections for low-back pain and found effective in six studies.<sup>22</sup> In several studies patients were followed after ESI for periods ranging from weeks to one year, showed to be beneficial.<sup>23,24</sup>

The ODI was decreased by more than 27% by first week and by more than 41% by the end of six month following epidural steroid injection. Similarly VAS score was decreased by 29% in the first week and by 51% 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.

The treatment of low back pain with radicular involvement has remained a matter of controversy because of multifactorial etiology and varying therapeutic modalities. Non-steroidal antinflammatory drugs, antidepressant, parenteral steroids, transcutaneous electrical nerve stimulation (TENS), traction and ultrasound have been used alone or in combination but without any proved efficacy.<sup>25</sup> Surgery is particularly indicated in cases with definite surgically correctable herniated discs but with a failure rate of as high as 30%. The incidence of persistent back pain after surgery was found to inversely proportional to the degree of herniation.<sup>26</sup> Hence ESI was found to be an alternative treatment modality with good results in symptomatic herniated disc, we also found the same result in this study.

In this study we used methylprednisolone for the management of low back pain. Our study showed significant relieve of the symptoms of herniated disc as well as improvement in the functional status of the patients.<sup>27</sup>

Methyl prednisolone is corticosteroid and is well known for its anti-inflammatory properties<sup>29</sup> and also stabilizes neural membranes, suppress ectopic neural discharges,<sup>30</sup> and may have direct anaesthetic effect on small unmyelinated nociceptive C-fibers.<sup>31</sup>

In our study we found 9 patients did not improve with ESI. Among them 6 patients undergone discectomy, 3 patients did not come for follow up. Considering those who didn't come for follow-up as failures, the success rate was 83.92%. Our findings support the studies done by Swerdlow *et al* and Winnie *et al*. They reported the success rates ranging from 63% to 80%.<sup>32,33</sup>

There are several factors for varied results like patient selection, technique of injection, dosage of steroid and follow up. In this study the patient who had undergone discectomy large herniated disc, multilevel disc prolapse and obese patient. In this study only 3 (5.3%) patients reported with local pain over the injection site, which subsided without treatment.

## CONCLUSION:

We conclude that epidural steroid injection for lumbar radicular pain is an Effective method of treatment. However the frequency of dose of epidural steroid injection may vary depending upon the outcome of the procedure.

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