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# Translaminar Cervical Epidural Steroid As A Treatment Modality In Cervical Radiculopathy In A Tertiary Level Referral Hospital

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## Citation

N Shah, P Mita, G Shobhana, M Shah, S Punatar. *Translaminar Cervical Epidural Steroid As A Treatment Modality In Cervical Radiculopathy In A Tertiary Level Referral Hospital*. The Internet Journal of Pain, Symptom Control and Palliative Care. 2010 Volume 8 Number 2.

## Abstract

**Background:** There has been a recent concern regarding the safety of Cervical Epidural Steroids. The decision requires a lot of balancing, between the risks and benefits to proceed with the conservative line of management in cervical radiculitis, caused due to disc herniation and surgery. **Methods:** In our present study we did a preliminary study on 50 patients suffering from cervical prolapsed intervertebral disc and cervical spondylosis with a follow-up of 24 months in a tertiary level referral hospital. The patients were epidurally instilled Lignocaine 2% 1ml and 0.9% Normal saline with Methyl prednisolone 80mg. in 3 doses given at an interval of 10 days. The efficacy, complications, side effects and technique of interlaminar cervical epidural steroid injections were reviewed. **Results:** Excellent response was defined as complete resolutions of symptoms, which occurred in 30%, symptom improvement of greater than 75% occurred in 60% subjects and 6% had 50% relief while 2 patients had no improvement. **Conclusion:** Cervical translaminar steroid injections with local anesthetic are highly effective in chronic discogenic and spondylitic pain.

## INTRODUCTION

Cervical radiculitis occurs in 83 per 1,00,000 population per year<sup>[1]</sup> The most common causes of cervical radiculitis in our study were herniated disc in 32% and spondylosis in 68% patients. The majority did not want to proceed for surgical line of treatment. Current treatment strategies involve a gradual progression in the aggressiveness of intervention, progressing from less to more invasive interventions extending till surgery in refractory cases. Initial treatment

consisted of activity modulation, NSAID's and physiotherapy which provide comfort in some of the cases and, if there was no improvement in 3-4 weeks of conservative treatment, cervical epidural steroid injections were planned. There were no major complications. There was dural puncture in one patient during one of the doses of Epidural steroid but no treatment was needed. The follow-up was done every week during the cervical epidural injections and thereafter every 1 month till relieving of symptoms and regular follow up every 3 months for rest of the 24 months.

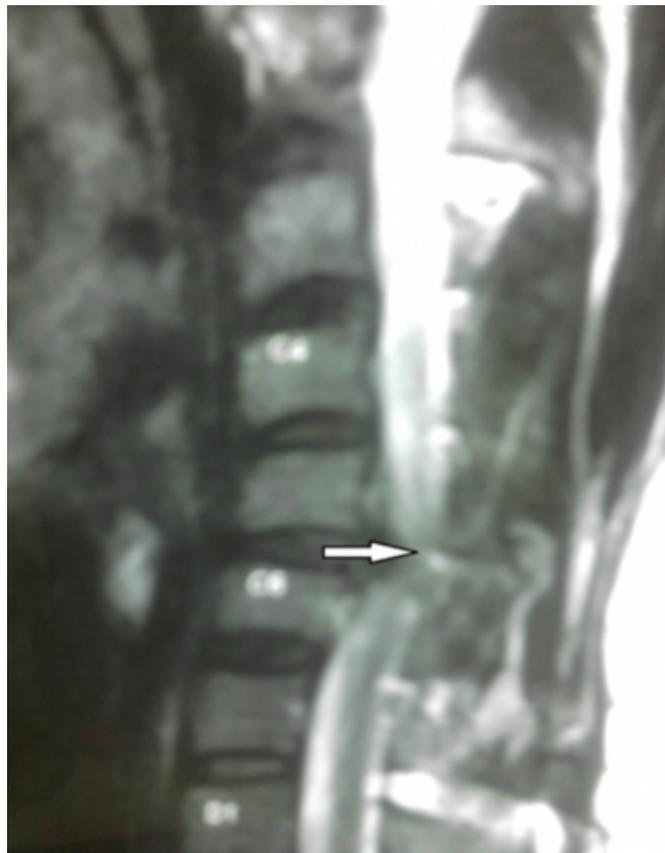
**Figure 1**

Figure 1 Cervical Spondylosis



**Figure 2**

Figure 2 M R I of herniated disc



## **MATERIALS AND METHODS**

Our study included 50 patients who underwent blind midline interlaminar 150 cervical epidural steroid injections for radicular or axial pain after obtaining approval of ethical committee. Inclusion of patients with neck pain and radicular pain from cervical disc herniation or cervical spondylosis that failed physiotherapy and medication in a tertiary level referral centre where, diagnosis was confirmed by Magnetic resonance imaging. Treatment consisted of relative rest, modulation, hard cervical collar, medications and physiotherapy. Following conservative treatment for 3-4 weeks with refractory symptoms, consent for cervical epidural steroid injections was taken.

**Figure 3**

TABLE: 1 Demographic data

Age	35-60 years	Mean 48.66 years
Sex	F=31	M=19
Causes	Cervical Spondylosis	34 patients (68%)
	Herniated nucleosus pulposus	16 patients (32%)

All patients received 3 injections performed every 10 days. Injection included 2% Inj. Lignocaine 1 ml with 5 ml 0.9% normal saline in 10ml syringe with 2ml 80mg Methyl prednisolone utilizing loss of resistance technique using 24G needle at C6-7 or C7-T1 interlaminar space. Pain was scored with Visual Analogue Scale (VAS) where the patient were explained the VAS where 0 means no pain and 10 means worst pain, and Verbal Numerical rating scale where 0 means no pain and profound analgesia and 10 was worst pain and no analgesia which was explained to the patients before proceeding for the procedure.

All the patients were post injection prescribed NSAID's and Methycobalamine 1500µg and Pregabalin 75mg for 1 month. An average follow up of 18 months ranging from 6 to 24 months underwent personal follow up or telephone talk.

**OBSERVATION AND RESULTS**

Excellent response in form of complete resolution of symptoms occurred in 30% and symptom improvement of greater than 75% occurred in 60% and 6% had 50% pain relief while 2 patients had no pain relief or any symptom improvement after 3 injections performed every 10 days and this result were recorded. An average follow-up of 18 months range (3-24 months) with 3 average injections. Pain decreased from VAS score 7.4 to verbal numeric scale score of 2.0. There was no change in the working capacity or any limitation of activity but there was significant reduction in usage of drugs.

**Figure 4**

TABLE: 2 Pain relief scores

Visual Analogue Scale	Preinjection 3.2	Post injection 7.4
Verbal Numerical rating score	Preinjection 6.8	Post injection 2.0

**Figure 5**

TABLE: 3 Pain relief

Follow up range	3-24 months	Average 18 months
Excellent response	15 patients	30% Patients
75% pain relief	30 patients	60% Patients
50% pain relief	3 patients	6% Patients
No relief	2 patients	4% Patients

The various complications reported during interlaminar cervical steroid injections include dural puncture nausea, vomiting, vasovagal reaction, nerve root injury, hypotension, transient blindness etc. In our study immediate complications like light headedness (10%) nausea (6%) and increased pain at injection site (20%). In our study only one patient during one injection had dural puncture and one patient had mild vasovagal reaction. After dural puncture there is concern about spinal headache but our patient did not have any headache and did not require any specific treatment apart from hydration and analgesics. At 12 months follow-up 6% patients i.e. 3 patients complained of increased neck pain and proceeded for surgery due to radicular pain from herniated disc.

**DISCUSSION**

Cervical epidural steroid injections is a time tested remedy for back pain and recent modalities for neck pain and brachialgia has innovated various modalities including the blind translaminar cervical epidural to transforaminal cervical epidural fluoroscopically. Cervical epidural injections are mainly used for relief of chronic pain in head and neck cancer and degenerative conditions of cervical spine. The cervical spinous processes are not angulated and so a horizontal approach is ideal and C7-T1 interspace is the widest and easiest to use. The ligamentum flavum is reached quite superficially and a gentle click is appreciated while piercing the ligamentum flavum. At C6-C7 and C7-T1 the epidural space measures 3-4 mm. which is increased to 5-6 mm. with neck flexion and this space turns narrower at higher segments and is only 1-2 mm at C5-6 due to cervical enlargement of cord. The sub atmospheric pressure in the space is exaggerated by flexion in sitting position. The meningeal dura and the endosteal fuse at the foramen magnum, and thus the diffusion of local anesthetics and narcotics is prevented, protecting the vital centres. The dural thickness is also 2.5mm. in cervical region as compared to 0.5mm. in the lumbar region and thus the chances of dural puncture are also rare.<sup>[1]</sup> Despite this the interspinous

ligament is absent in cervical spine and so the loss of resistance technique used lacks resistance from interspinous ligament and unfused ligamentum flavum could lead to risk of dural puncture.<sup>[2]</sup>

The rationale for corticosteroid instillation is anti-inflammatory effect, on increased levels of matrix metalloproteinase activity, nitric oxide, prostaglandin E2 and interleukin-6<sup>[3]</sup>. Phospholipase A2 plays a role in the inflammation in the nerve root and is neurotoxic<sup>[4,5]</sup>. Epidural steroids inhibit Phospholipase A2, thus reducing the symptoms<sup>[5]</sup>. Corticosteroids mitigate nerve conduction slowing due to inflammation and affects the cell mediated activity and cytokines, which are involved in pathogenesis of radicular pain.<sup>[6-7]</sup> Corticosteroids stabilize the nerve membranes inhibiting ectopic impulses, inhibits ion conductance, hyperpolarizes spinal neurons and inhibits C fibers transmission, thus causing relief of symptoms in non inflammatory states.<sup>[8, 9, 10, 11]</sup> Local anesthetics mixed with corticosteroid have additional benefits beyond their direct local anesthetic effects, especially lignocaine has anti inflammatory effect on nucleus pulposus induced nerve injury by increasing the intra radicular blood flow, improves intraneural metabolism and reduce inflammatory mediators in animal models<sup>[12, 13]</sup>.

Mangar and Thomas reported results of 40 subjects who underwent 117 blind interlaminar CESI for cervical radiculitis and reported greater than 70% pain relief and more than 50% relief were reported in 38% and 7% respectively. No relief occurred in 32%. However, 75% of subjects with herniated had improvement<sup>[14]</sup>.

Ferrante also studied 100 subjects who underwent 235 blind midline interlaminar CESI for radicular or axial pain and 62% patients had greater than 50% pain relief. The observational studies suggest a success rate of 40-62% for blind interlaminar CESI for cervical radiculopathy.<sup>[15]</sup>

Bush prospectively reported that 13 patients with cervical radiculopathy from herniated nucleus pulposus that received a blind injection, CESI with an average follow up of 12 months, and had 12 patients who had complete resolution of symptoms.<sup>[16]</sup>

Saal experienced an 83% success rate for nonoperative management of radiculopathy from cervical disk herniation in 26 subjects.<sup>[17]</sup>

Our study included 50 patients who underwent blind midline

interlaminar 150 cervical epidural steroid injections for radicular or axial pain. Inclusion of patients aged 35 to 60 years of both sexes with neck pain and radicular pain from cervical disc herniation or cervical spondylosis that failed physiotherapy and medication in a tertiary level referral centre where symptoms were not relieved with medical line of treatment, and the diagnosis was confirmed by Magnetic resonance imaging. Treatment consisted of relative rest, modulation, hard cervical collar, medications and physiotherapy. Following conservative treatment for 3-4 weeks with refractory symptoms, consent for cervical epidural steroid injections was taken. All patients received 3 injections performed every 10 days. Injection included 2% Inj. Lignocaine 1 ml with 5 ml 0.9% normal saline in 10ml syringe with 2ml 80mg Methyl prednisolone utilizing loss of resistance technique using 24G needle at C6-7 or C7-T1 interlaminar space<sup>[15,23,24,25]</sup>. Pain was scored with Visual Analogue Scale (VAS) where the patient were explained the VAS where 10 means no pain and 0 means worst pain, and Verbal Numerical rating scale where 0 means no pain and profound analgesia and 10 was worst pain and no analgesia which was explained to the patients before proceeding for the procedure.

All the patients were post injection prescribed NSAID's and Methycobalamine 1500µg and Pregabalin 75mg for 1 month. An average follow up of 18 months ranging from 6 to 24 months underwent personal follow up or telephone talk.

Gabapentin and Pregabalin is a structural analogue of gamma amino butyric acid where the binding capacity of Pregabalin and its potency is six times more than Gabapentin. It produces inhibitory modulation of neuronal excitability in CNS dense in synaptic connection such as neocortex, amygdala and hippocampus. IT mediates analgesia through modulation of glutamate receptors, by inhibiting nociceptive responses to intrathecal NMDA and AMPA. Upregulation of alpha and delta subunit of presynaptic voltage dependent calcium channels, plays an important role in hypersensitization, modulates calcium influx of nerve terminals and reduces the release of neurotransmitters increasing glutamate, noradrenaline, serotonin, dopamine and substance P.<sup>[18,19]</sup>

Excellent response in form of complete resolution of symptoms occurred in 15 patients (30%) and symptom improvement of greater than 75% occurred in 30 patients (60%) and 3 patients (6%) had 50% pain relief while 2 patients (4%) had no pain relief or any symptom

improvement after 3 injections performed every 10 days and these results were recorded. An average follow-up of 18 months range (3-24 months) with 3 average injections. Pain increased from VAS score 3.2 to 7.4 verbal numeric scale score of 6.8 to 2.0. There was no change in the working capacity or any limitation of activity but there was significant reduction in usage of analgesics.

The various complications reported during interlaminar cervical steroid injections include dural puncture nausea, vomiting, vasovagal reaction, nerve root injury, hypotension, transient blindness etc. In our study immediate complications like light headedness occurred in (10%), nausea in (6%) and increased pain at injection site in (20%) during 150 injections. In our study only one patient during one injection had dural puncture and one patient had mild vasovagal reaction. After dural puncture there was concern about spinal headache but, our patient did not have any headache and did not require any specific treatment apart from hydration and analgesics. At 12 months follow-up 4% patients i.e. 2 patients complained of increased neck pain and proceeded for surgery due to radicular pain from herniated disc. Rest of the patients presented for regular follow up either personally or on telephonic talk and the results did not change at 24 months follow up, nor did their working capacity which showed improvement after the injections with drastic reduction in the analgesic requirement.

Despite development in the various newer modalities of delivering corticosteroids in the epidural space has changed from blind interlaminar CESI to interforaminal with or without fluoroscopy, the blind technique holds a strong stand in a tertiary referral level hospital which shows equally comparable results in pain relief as far as CESI is concerned.

TABLE: 4 Complications during 150 injections:

Figure 6

Light headedness	10%
Nausea	6%
Increased pain at injection site	20%
Dural puncture	0.66%
Vasovagal reaction	0.66%

The side effects documented include dural puncture, nausea, vomiting, vasovagal reaction, facial flushing hypotension, cord injury, headache, dizziness, injection site pain etc as

immediate complications while epidural haematoma and abscess as delayed ones.<sup>[20]</sup> Systemic side effects of corticosteroids can results in hyperglycemia and Cushing's syndrome.<sup>[21,22]</sup>

## CONCLUSION

Translaminar Cervical Epidural Steroid Injections are highly effective in Herniated disc and Cervical Spondylosis where conservative line of management fails. Despite advancements in techniques of epidural steroid injections, Translaminar technique holds a valuable place in a primitive set up with limited resources.

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