Clonidine as an Adjuvant in Fluoroscopic-guided Transforaminal Epidural Steroid Injection in a Patient of Chronic Lumbosacral Radiculopathy

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Abstract

Transformaminal epidural steroid injection (TFESI) is a minimally invasive modality used to treat patients with lumbosacral radiculopathy secondary to prolapsed intervertebral disc or spinal canal stenosis. In this case report, we describe the management of a patient with chronic lumbosacral radiculopathy secondary to intervertebral disc herniation which was seen as a right paracentral disc protrusion at levels L4-L5, L5-S1 causing thecal sac indentation, effacement of the right lateral recess and right exiting nerve root impingement as was seen on the magnetic resonance image. Diffuse disc bulge at levels L4-L5 and L5-S1 caused thecal sac indentation with right neural foraminal narrowing. There was no evidence of associated facet joint arthropathy. Owing to the persistence of symptoms for >6 weeks despite medicines and an ESI through the caudal route 4 weeks back, anticipation of efficacy of TFESI with methylprednisolone using clonidine as an adjuvant in our patient was justifiable.

Keywords: Clonidine, lumbar disc herniation, transforaminal epidural steroid injection

INTRODUCTION

Lumbosacral radiculopathy is one of the most common medical and socioeconomic problem worldwide. The treatment modalities over the years have been many ranging from prolonged bed rest to use of analgesics, acupuncture, surgical decompression and so on. The use of minimally invasive Fluoroscopic Guided Transforaminal Epidural Steroid Injection (TFESI) at the desired level is a new modality that appears quite promising for its tendency of delivering the drug close to the target site under vision. In the subsequent case report we performed TFESI in a 54-year old female using Clonidine (50 micrograms) as an adjuvant with Methyl Prednisolone (40 milligrams) at levels L4-L5 and L5-S1. Clonidine is added to local anesthetics n ESI for its role to improve analgesia and to increase the duration of sensory block.

CASE REPORT

A 54-year-old female (weight 55 kg, 160 cm) was referred by an orthopedic surgeon to our pain clinic for persistent low back pain radiating down to right leg. She had a history of low back pain associated with radiculopathy, which was more on the right side and radiated till the big toe for more than 6 weeks. The impression on the magnetic resonance imaging (MRI) revealed a right paracentral disc protrusion at levels L4-L5, L5-S1 causing thecal sac indentation, effacement of the right lateral recess and right exiting nerve root impingement. There was no associated lumbar canal stenosis and no evidence of facet arthropathy. She had been taking analgesics tablet diclofenac 650 mg, tablet pregabalin 75 mg, tablet nortriptyline 10 mg, and regular physiotherapy for the last 6 weeks. She even underwent an epidural steroid injection (ESI) through the caudal route

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with 4 ml of 0.5% bupivacaine, 1 ml of methylprednisolone, and 5 ml of normal saline at a tertiary care center 4 weeks back after which her symptoms improved marginally for a period of 1 week and then she again started with debilitating pain, not getting relieved with analgesics and other modes of conservative management. The complete motor and sensory examination of the patient revealed motor power of Grade V, i.e. the muscle can move the joint; it crosses through a full range of motion against gravity and resistance. The sensations were intact as elicited by pain, temperature, vibration, position sense, stereognosis, and two-point discrimination. All the superficial and deep tendon reflexes were intact with an SLR of 10° on the right side and 70° on the left side. The patient had full control over the bladder and bowel.

We hence planned, fluoroscopic-guided transforaminal ESI (TFESI) using clonidine as an adjuvant at levels L4-L5 and L5-S1 on the right side, after discussing both with the patient and the orthopedic surgeon.

After taking an informed written consent, an 18-gauge intravenous cannula was secured. All routine monitors (electrocardiography, noninvasive blood pressure, and oxygen saturation) were attached. The patient was positioned on the operating room table with a pillow underneath the abdomen in the prone position. Under fluoroscopic guidance, the standard safe triangle was identified with pedicle of the vertebrae forming one arm of the triangle, lateral border of vertebral body forming the second arm, and the hypotenuse being formed by the exiting nerve root. Under all aseptic precautions, the skin overlying the target area was anesthetized with 2 ml of 1% lidocaine. The level of the epidural injection was chosen depending on the MRI findings and physical examination as L4- L5 and L5-S1.

A 22-gauge spinal needle was then advanced under fluoroscopy aiming the needle at the superior and anterior part of the intervertebral foramen through the safe triangle. The needle placement was confirmed after injecting 1–2 ml of omnipaque, nonionic water-soluble contrast medium iohexol dye, demonstrating the contrast going through the foramen. Furthermore, the confirmation of the needle position with contrast dye reduced the possibility of misplacement or intravascular placement of the needle, which is always a risk in ESIs performed without fluoroscopy. The needle was advanced into the safe triangle, and its placement was then confirmed both by anteroposterior and lateral view. One milliliter methylprednisolone (40 mg) mixed with 0.5 ml clonidine (50 μg) and 1 ml bupivacaine 0.5% were given at each level (volume 2.5 ml).

After the completion of the procedure, the patient was transferred to the recovery area. The patient’s hemodynamic parameters were monitored during and after the procedure. Assessment of pain relief and any motor or sensory deficit was checked immediately and then hourly after the procedure till discharge from the recovery area.

The patient was discharged after having met the following discharge criteria after 2 h:
1. The patient was able to walk unaided
2. The patient was able to void her bladder without any difficulty.

She was assessed for any numb or weak feeling in her back or legs for a few hours after the injection.

After 24 h, the patient was discharged from the hospital, and there was a significant improvement in the pain with an improvement in the SLR to 60°.

Following instructions were given at the time of discharge:
• To report any untoward incident
• To continue taking analgesics as advised
• To start back muscle strengthening exercises after 3 days if there was considerable pain relief.

Patient was then reassessed at 2 weeks, 1 month, and 3 months interval after the procedure. There was a significant improvement in the pain after single injection of TFESI using clonidine as depicted by the visual analog scale (VAS) score; there was a much reduced drug dose intake and an improvement in the daily life activities as stated by the patient.

**DISCUSSION**

Prolapsed intervertebral disc is a common medical and socioeconomic hazard worldwide.[1] The basic pathogenesis is the herniation of the intervertebral disc leading to disc swelling due to the release of local mediators of inflammation such as phospholipase A2, leukotrienes, and prostaglandins. This disc swelling in turn leads indirectly to the nerve root irritation and pressure symptoms due to its bulging effects. The idea, therefore, is to eliminate the inflammation which could then help in reducing radiculopathies secondary to nerve inflammation. ESIs are a modality that appears quite promising, for its benefit of delivering medication to the lesion.

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The three routes of entry to the epidural space are:
• Caudal
• Interlaminar
• Transforaminal.

All are actively practiced today and have their own unique benefits and pitfalls. The superiority of one route over the
others is controversial because of documented as well as perceived differences in efficacy and safety.\textsuperscript{[3]} ESI through caudal route is less effective than the transforaminal route that we employed in our patient as the drug through TF route is delivered just adjacent to the target site, and it is more specific for either side (right or left).\textsuperscript{[9]} Another advantage is a lesser quantity of drug required through the TF route which poses a much lesser threat in cases of complication such as an inadvertent intravascular injection.\textsuperscript{[7]}

Clonidine, which is an $\alpha$-2 adrenergic agonist, has been traditionally used as an antihypertensive agent. The large expression of $\alpha$-2 receptors in the central nervous system, i.e. in the locus coeruleus and the dorsal horn of the spinal cord, has eventually focused the interest of this drug on centrally mediated sedation and analgesia. Clonidine’s safety record and dual action as an analgesic and anti-inflammatory agent in the setting of peripheral nerve injury make it an intriguing alternative to many other drugs being used in epidural injections for treating radicular pain.\textsuperscript{[8]}

**Conclusion**

Our preferred transforaminal route proved better than the caudal route for its obvious effects due to the delivery of the drug preparation in the close vicinity to the nerve root which aided target specificity. Using clonidine as an adjuvant showed a tremendous increase in the analgesic efficacy and the duration of pain relief of TFESI with methylprednisolone as assessed by the VAS score and the patient satisfaction score. There was an improvement in patient return to work status, drug dose intake reduction, and the VAS score.

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**Conflicts of interest**

There are no conflicts of interest.

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