A Clinical Trial of Epidural Steroid Injection (ESI) in the Treatment of Low Back Pain

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The use of steroid injection through epidural route for the relief of low back pain is a conservative management. Here the effects of epidural steroid injection (ESI) in the treatment of low back pain were analyzed in a retrospective series of 72 patients (36 patients with acute low back pain and other 36 patients with chronic low back pain) in Orthopaedic Department of Dinajpur Medical College Hospital, Dinajpur and in different local clinics at Dinajpur from February, 2009 to February, 2010 is described. The procedure was performed by same operator and follow up done at first and sixth week postoperatively. In this study, 28 patients out of 36 in acute LBP group showed 77% pain improvement and 11 patients out of 36 of chronic LBP group showed only 30% of pain improvement. So, it is concluded that epidural steroid injection is a simple, cost effective and minimally invasive treatment for LBP especially in acute phase.

[Dinajpur Med Col J 2011 Jan; 4 (1):26-30]

Key words: Epidural steroid, low back pain (LBP), methylprednisolone, Tuohy needle, straight leg raising (SLR) test.

Introduction

ESIs have been used for low back pain since 1952 and are still an integral part of the non-surgical management of sciatica and low back pain.[1] It has been widely used in many countries and all comments with varying success as reported in the United Kingdom, USA, India, Australia, Newzeland and Europe.[2] ESIs provide relief from pain for one week up to one year.[3] Importantly, it can provide sufficient pain relief to allow a patient to progress with rehabilitative stretching and exercise program. If initial injection is effective for a patient, he/she may have up to three in a one year period.[4] The present study was aimed to present a single operator's experience with measurable parameters (pain improvement, spinal motion improvement and straight leg raising test.)

An epidural steroid injection delivers steroids directly into the epidural space in the spine. Additional fluid like local anaesthetic is used to help 'flush out' inflammatory mediators from around the area that may be a source of pain.[2] Inflammation is a common component of many low back conditions and reducing inflammation helps to reduce pain.[4]

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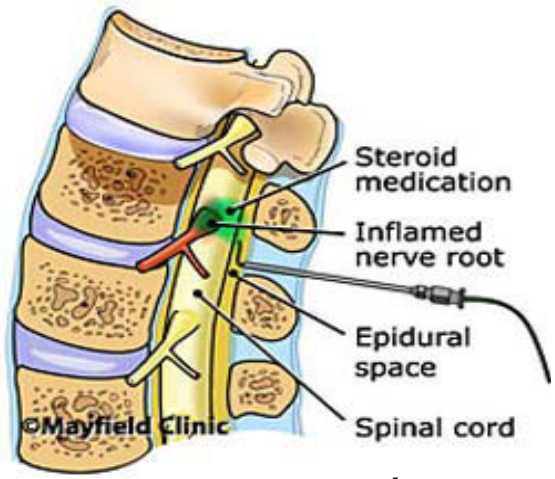

Figure 1. ESI over inflamed nerve root[5]

Inflammation of nerve roots is caused by phospholipase A 2 (PLA – 2) which is present in high concentration in nuclear material. This enzyme liberates arachidonic acid from cell membranes which is the precursor of inflammatory substances such as prostaglandins. Steroids act by preventing the action of PLA – 2 on cell membranes and thus by inhibiting the release of arachidonic acid. The earlier steroids are injected, the greater the possibility of success since the entire process is inflammatory. With passage of time, process of healing begins with resultant intra and extra neural fibrosis. Methylprednisolone is the safest steroidal agent when used epidurally as the risk of adhesive arachnoiditis is very low.[6] Additional fluid like 2% lignocaine is a fast acting local anesthetic used for temporary pain relief.[7] Although primarily used for pain relief, lignocaine also act as 'flushing' agent to dilute the chemical or immunologic agents that promote inflammation.

Methods

Pre-aneaesthetic evaluation included a complete physical checkup and evaluation of lab tests done. All patients were informed about the planned interventional therapy and written consent taken. They were advised pre-operative fasting six hours prior to the procedure. Inside the operation theatre, venous access done 18G intravenous cannula and intravenous ringer lactate drip was started. All resuscitative equipments along with anesthesia machine were kept stand by to prevent any possible adverse reaction. Patients were placed in the lateral decubitus position. Under full aseptic technique, pre-determined disc level was located by surface anatomy. No fluoroscopy was used. Two cc 0.5% lignocaine infiltrated to the skin and subcutaneous tissues.

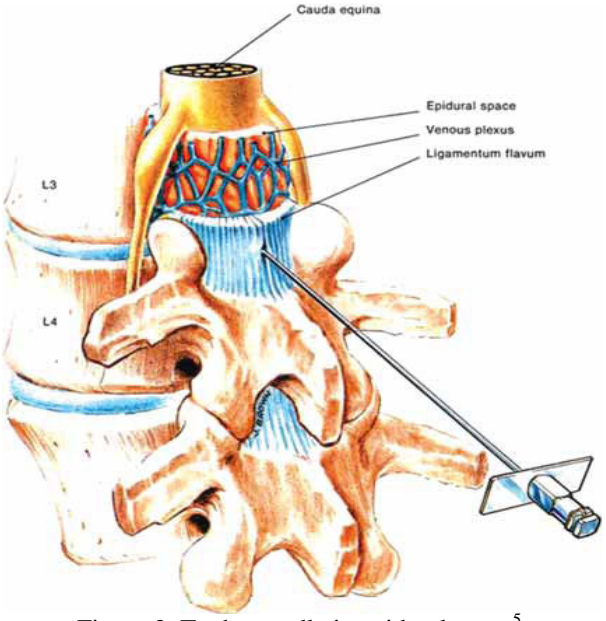

Figure 2. Tuohy needle in epidural space[5]

An 18G Tuohy type epidural needle was inserted at the midline of the back of the selected site with the bevel upwards and stylet in position. After the interspinous ligament was pierced, a 5 cc disposable syringe with 0.5cc lignocaine was attached to the Tuohy needle after stylet removal. The needle was advanced slowly and tests for 'loss of resistance' were carried out at intervals. After the ligamentum flavum was pierced, the epidural space was entered and a positive 'loss of resistance' test was carried out. An 'air injection test' was then applied. This involved warning the patient first, then 2-3 cc of air was rapidly injected into the epidural space with the disposable syringe. This

further confirmed that the epidural space (a potential space) was entered. The patient might then cry out or wince as the sciatica was reproduced – signifying the correct placement of the needle point as the nerve root was sensitive to the increase of pressure. Then 80 mg of Methylprednisolone (Inj Depo-Medro 40 mg, MRP 110.00 Taka BD) injected through epidural catheter. After that 2 cc 0.5% lignocaine injected through epidural catheter. The epidural catheter was securely placed over the back by micropore or leucoplast. On the next 2nd and 3rd day 2 cc 0.5% lignocaine injected through epidural catheter at morning and evening. On 4th day- again 80 mg of Methylprednisolone injected through epidural catheter and removing of epidural catheter from the back of body of the patient.

Results

From February 2009 to February 2010, 72 consecutive cases of epidural steroid injection for the treatment of low back pain were performed in Dinajpur Medical College Hospital, Dinajpur and local different clinics in Dinajpur using full aseptic technique in the operating room.

All patients had preoperative physical examination, measurements, plain radiological examination and haematological tests performed to exclude inflammatory, infective and neoplastic conditions.

Patients' age ranged from 20 to 70 years. There were 47 male patients and 25 female patients. The duration of preoperative symptoms was less than 1 to 20 weeks. Patients with symptoms less than 3 weeks of onset were regarded as acute (36/72 i.e.50%) and the rest (36/72 i.e. 50%) were chronic. Grading was recorded for pre-operative pain, spinal motion (flexion and extension) and measurements taken for ipsilateral straight leg raising test.

Symptom-wise preoperative pain was classified into mild (Grade I – 0 cases), moderate (Grade II – acute: 25, chronic: 30), severe (Grade III – acute: 07, chronic: 6), excruciating (Grade IV – acute 04, chronic 0).

Complications like infection, dural puncture (wet tap), bleeding etc are negligible and temporary.

Out of 36 patients 28 in acute LBP group showed 77% pain improvement, 11 patients of chronic LBP group showed only 30% of pain improvement (table I).

Patient satisfaction score - acute group showed 7% poor, 26% moderate, 67% good pain control and chronic group showed 64% poor, 26% moderate and 10% good pain control (table II).

Thirty nine patients of both group showed significant increase of ipsilateral SLR. Both groups showed in the range of 20^0 improvement of ipsilateral SLR (table III).

Analysis

Pain improvement – results were divided according to preoperative pain grade. Twenty eight patients out of 36 in acute LBP group showed 77% pain improvement, 11 patients of chronic LBP group showed only 30% of pain improvement (table I).

According to patient satisfaction score acute group showed 7% (2/28) poor, 18%+4%+4%=26% (7/28) moderate, 46%+14%+7%=67% (19/28) good pain control and chronic group showed 54%+10%=64% (7/11) poor, 26% (3/11) moderate and 10% (1/11) good pain control (table II).

Table I: Post operative pain improvement expressed in number and percentage

Preoperative Pain grade	Number of patients		Improvement of pain		% of pain improvement	
	acute	chronic	acute	chronic	acute	chronic
Grade II	25	30	20	10	56%	27%
Grade III	07	06	05	01	13%	03%
Grade IV	04	00	03	00	08%	--
Total	36	36	28	11	77%	30%

Table II: Patient satisfaction score expressed in number and percentage

Preoperative Pain Grade	Improvement of Pain. Group (Number)	Patient Satisfaction Score. Number (%)		
		Poor	Moderate	Good
Grade II	Acute (20)	02 (7%)	05 (18%)	13 (46%)
	Chronic (10)	06 (54%)	03 (26%)	01 (10%)
Grade III	Acute (05)	00	01 (4%)	04 (14%)
	Chronic (01)	01 (10%)	--	--
Grade IV	Acute (03)	00	01 (4%)	02 (7%)
	Chronic (00)	--	--	--

Table III: Post operative improvement of SLR test in both groups

Group	Total number of patients	Number of patients showed improvement of Ipsilateral SLR.	Ipsilateral SLR increase in degrees.	Range value in the degrees of improvement of Ipsilateral SLR.
Acute	36	28	60^0 to 80^0	20^0
Chronic	36	11	40^0 to 60^0	20^0

Spinal motion improvement – increase of spinal flexion was recorded from 0^0 to 70^0 with a mean increase of 32^0 and extension increase ranged from 0^0 to 30^0 with a mean increase of 11^0 in 28+11=39 patients out of 72 patients of the study.

Post operative ipsi-lateral (affected side) SLR – SLR test discloses lumbosacral root tension. Normally it should be possible to raise the limb to 80^0 to 90^0. In this study, 28+11=39 patients of both group showed significant increase of ipsilateral SLR. Both groups showed in the range of 20^0 improvement of Ipsilateral SLR (table III).

Discussion

LBP occurs from a variety of causes and only second to headache in respect of its incidence.[5] In fact most of the patient will suffer from LBP in some parts of their lives. Acute as well as chronic LBP are mostly treated conservatively by rest. But in some cases of acute especially with disc prolapse severe pain could not be relieved by above mentioned conservative method. In that case surgical intervention is indicated. But this type of surgical management requires comprehensive operative facilities which are not easily to make available at district level hospitals in Bangladesh.

In this situation ESI is a very good and effective alternative to surgical intervention. This procedure could be done in any ordinary operation theatre and does not require much expertise, with minimal risk and very much cost effective.[8]

Its (ESI) success rate is very encouraging (77%) especially in acute cases and is mare or less same as with other studies like Epidural steroid injection for sciatica: an analysis of 526 consecutive cases with measurements and the whistle test.[9,10]

Conclusion

This study demonstrates ESI is a simple, cost effective and minimally invasive treatment for LBP especially in the acute cases. Decreasing pain and inflammation even temporarily will greatly improve patient symptoms and allow a decrease in analgesic use and a more rapid return to work.

References

1. Sung MS – Epidural steroid injection for lumbosacral radiculopathy. Koren J Radiol , 2006;7:77-79
2. Berman AT, Garbarino JL Jr, Fisher SM, Bosacco SJ – The effects of epidural injection of local anesthetics and corticosteroids on patients with lumbosciatic pain. Clin Orthop 1984 Sept 188: 144-151
3. Campbell's Operative Orthopaedics – 7th edition, 1987 Crenshaw AH Vol-4:3293-4. The C V Mosby Co. St Louis, USA.
4. Manchikanti L, Transforaminal lumber epidural steroid injections – Pain Physician, 2000; 3: 374-398
5. James D Artuso, MD – Back pain and needles: the journal of Lancaster General Hospital, Fall 2007, vol 2 – no:3
6. Wilkinson HA – Intrathecal Depo-MedroL: A literature review. Clin J Pain 1992;8:49-56
7. Arden NK, Price C, Reading I, et al – A multicentre randomized trial of epidural corticosteroid injections for sciatica: The west study, Rheumatology, 2005, 44:1390-1406.
8. Brown FW – Management of diskogenic pain using epidural and intrathecal steroids. Clin Orthop 1977 Nov-Dec (129): 72-8
9. Abdi S, Datta S, Lucas LF. Role of epidural steroids in the management of spinal pain: A systemic review of effectiveness and complication. Journal of Orthopedic Surgery 2000, 8(1):39-44.
10. White AH, Derby R, Wynne G – Epidural injections for the diagnosis and treatment of sciatic pain. Spine Journal 1980; 5:78-86.