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Research Article

CLINICAL EVALUATION OF TRANSFORAMINAL EPIDURAL STEROID INJECTION IN MANAGING CHRONIC LOW BACK PAIN WITH RADICULOPATHY

***Borgohain Dhruba, Chacko Bobby and Deori A.K.**
Department of Anaesthesiology, Assam Medical College, Dibrugarh
**Author for Correspondence*

ABSTRACT
Low back pain (LBP) is one of the most common complaints that a patient presents with at a pain clinic which results in significant disability & loss of productive work. The study is an uncontrolled, prospective study that included 35 patients (20 males and 15 females) during the period 2012–2014 with signs and symptoms of back pain with lumbar radiculopathy, in whom conservative treatment of least 8 weeks had failed. The present study was undertaken with the aim to observe the effectiveness of transforaminal epidural injection (TESI) of a combination of depomedrol (methyl prednisolone acetate) along with a local anaesthetic (0.5% bupivacaine) in relieving symptoms of chronic low back pain with radiculopathy. Quantitative assessment was done for back pain & leg pain separately using the visual analogue scale and the fuctional disability was measured using oswestry disability index (ODI) before the procedure and at regular intervals after the procedure for a period of 6 months. All the patients had an ODI more than 40% before the procedure. Under fluoroscopic guidance, the 'scotty dog' was identified in the oblique view. The point of injection is at the 6'O clock position of the pedicle where a 23 gauze spinal needle was introduced in tunnel view through which 40mg (1ml) of Depomedrol with 2ml of 0.5 % bupivacaine was injected after confirmation with 0.5 ml of iohexol which delineates the nerve roots. At 24 hours, significant pain relief was seen in all the patients except one. After 3 weeks, symptomatic improvement was seen in 97.1 %(34/35 patients) of the cases, with good results in 71.4 % (25/35, ODI 0-20%) and fair result in25.7 %(9/35, ODI 20-40%)). After 6 months, symptomatic improvement was seen in 68.5 % of the cases with good result in 45.7 % and fair results in 22.8% of the patients. No major complications were recorded. Thus, it can be concluded that transforaminal epidual steroid injections are a safe and effective modality of treatment in chronic back pain with good short term results and possibly long term in some patients.

Keywords: *Chronic Low Back Pain, Lumbar Radiculopathy, Transforaminal Epidural Steroid Injection*

INTRODUCTION
Low back pain (LBP) is one of the most common complaints that a patient presents with at a pain clinic. It has been an important clinical, social, economic, and public health problem affecting the human population worldwide (Freynhagen *et al.,* 2006) and is one of the most prevalent medical diseases in industrialized countries (Levine *et al.,* 1993) Low back pain affects the area between the lower rib cage and gluteal folds and often radiates to thigh (Frymoyer *et al.,* 1998) and found to be a common disability in patients under the age of 40 years (Engstrom *et al.,* 2001) The treatment and management of low back pain needs multidisciplinary approach. The natural history of lumbar disk herniation has been elucidated by means of serial imaging studies, which showed spontaneous clinical and anatomic resolution in 67-76% of patients after 1-year (Bozzao *et al.,* 1992; Bush *et al.,* 1992; Delauche-Cavallier *et al.,* 1992; Gallucci *et al.,* 1995). Therefore, an invasive approach is reserved for patients failing to respond to conservative treatment. In 1930, Evans reported that sciatica could be treated by epidural injection. The use of epidural corticosteroid injections for the treatment of axial and radicular back pain was first reported in 1953 (Sitzman *et al.,* 2003). Epidural steroid injections are currently used by many medical professionals for the treatment of lumbosacral radiculopathy. Interlaminar and caudal epidural injections require relatively large volumes of injectate to deliver the steroid to the presumed pathologic site, and these types of injections also have the risk of extra-epidural and intravascular needle placement. The

transforaminal approach is target-specific and requires the smallest volume to reach the primary site of pathology; specifically, the anterior-lateral epidural space as well as the dorsal root ganglion. Thus, transforaminal epidural steroid injection (TESI) under fluoroscopic guidance has emerged as the preferred approach to the epidural space (Sitzman *et al.*, 2003; Vad *et al.*, 2002; Gajraj *et al.*, 2004)

Taking into consideration of all these facts, the present study was undertaken with the aim to observe the effect of transforaminal epidural injection of a combination of depomedrol (methyl prednisolone acetate) along with a local anaesthetic (0.5% bupivacaine) in relieving symptoms of chronic low back pain in whom conservative treatment with rest and oral analgesics of at least 8 weeks had failed to respond.

MATERIALS AND METHODS

The study is an uncontrolled, prospective study that included 35 patients (20 males and 15 females) during the period 2012–2014 who attended pain clinic, Department of Anaesthesiology, Assam medical college, Dibrugarh, Assam. The patients were selected randomly according to the following clinical criteria.

Inclusion Criteria

Patient of either sex with age above 30 years and below 60 years with chronic low back pain and/or leg pain with a positive SLR test or femoral stretch test in whom there was no relief in signs & symptoms with a 8 weeks trial of conservative treatment like rest, analgesics etc.

Exclusion Criteria

The patients below the age of 30 and above 60 years, having low back pain for less than 3 months, with traumatic low back pain or acute and inflammatory low back pain, with any complication like cauda equine syndrome, caries spine, malignancy, rapidly progressing neural deficit which would need urgent surgery, bleeding diathesis etc.

Assessment Procedure

Patients who failed to respond to conservative treatment for atleast 8 weeks, were taken up for the Transforaminal Epidural Steroid Injection (TESI) procedure. Basal (preprocedural) quantitative assessment of back pain and/or leg pain were recorded using Visual Analog Scale (Williams *et al.*, 2000; Price *et al.*, 1994; Mannche *et al.*, 1994) from 0–10 (0 = no pain and 10 is worst possible pain). Their basal functional efficacy was also assessed by utilizing the Oswestry Disability Index (ODI) in which scoring was done from 0-100. An ODI score of 0-20% indicates minimal disability, 21-40% indicate moderate disability, 41-60% indicate severe disability, 61-80% indicate crippled status and 81-100% indicate bed bound patients or one who is exaggerating his symptoms (Fairbank *et al.*, 2000).

Clinical examination included straight leg rising test, femoral stretch test and also neurological examination of both the lower limbs. Investigations included complete blood count , erythrocyte sedimentation rate, random blood sugar , bleeding time, coagulation time and Magnetic Resonance Imaging (MRI) of the lumbosacral region. A proper informed consent was taken and the procedure was carried out under strict aseptic and antiseptic measures in the pain clinic operation theatre which is equipped with the necessary resuscitative equipments and an image intensifier. Patient is asked to lie comfortably in prone position, the C-arm in AP position, the structures (vertebral body, vertebral end plate, pedicle, facet joint, spinous process, transverse process) are identified. The 'scotty dog' was identified in the oblique view when the superior articular process of the inferior vertebra will align in the 6'O clock position of the pedicle of the vertebra above. The point of injection is at the 6'O clock position of the pedicle. The skin is infiltrated with 2% lignocaine and after 1 minute, the injection is made with a 23 gauze quincke beveled spinal needle under tunnel vision. The needle will look like a dot in the image intensifier. The position is checked in the lateral view also when the tip of the needle lies in the postero-superior quadrant of the foramen. After negative aspiration, about 0.5 ml of non-ionic radio opaque dye (Iohexol) was injected for proper location & the nerve root is delineated. Finally the drug Depo-medrol 40 mg (1ml) along with 2 ml of 0.5% bupivacaine was injected. After the procedure, the patients were adviced to lie down in supine position for 4-6 hours and monitored for any inconveniences. After the treatment as per schedule, the patients were followed up for pain relief using VAS and ODI scores ,stretch

signs and neurological status at 24 hrs and then at 3 weeks ,3 months and then at 6 months. Most of the patients were given a single epidural injection. Only few (8 patients, 22%) received a second injection at three weeks follow up as the patients had responded initially immediately after TESI but the effect was short lived.

At follow-up, the functional efficiency results in patients with mild disability (ODI 0-20%) was classified as good, with moderate disability (21-40%) as fair, with those with disability of 41% and more as poor.

RESULTS AND DISCUSSION

A total of 35 patients of chronic low back pain were included in the present study. These included 20 males and 15 female patients. Most of the patients in both males and females were found in the age group of 33–55 years .The mean weight of patients was 63.25 ± 5.5 kg. Most of the patients (94%) gave history of gradual onset of pain. Maximum patients had pain of intermittent character (85%) while (15%) had pain of continuous character.

At initial presentation, the mean VAS for back pain was 4.5 ± 0.8 ((range 2-6) and leg pain was 6.5±0.5 (range 5-8). All the patients had ODI more than 40% at initial presentation, with an average ODI of 48.5±5.6 (44-72), of which 34 patients had severe functional disability (ODI 41-60%) and only one patient had an ODI score of 72% (crippled status). All the patients had leg stretch sign positive but without any motor weakness.

At 24 hours, significant pain relief was seen in all the patients except one. At 3 weeks, the average VAS score for backache was 1.7±0.8 and the decrease in the average VAS score for backache as compared to preprocedure level was 2.8. The average VAS score for leg pain at 3 weeks was 1.7± 0.5 with the decrease of 4.8 value in the average pain score for leg pain as compared to the preprocedure value. Thus, a greater degree of relief was seen in leg pain as compared to back pain. At 3 months, the decrease in the average VAS score for backache and leg pain was 2.5 and 3.6 respectively. At 6 months, the decrease in the average VAS score for back pain and leg pain as compared to preprocedure level was 2.2 and 3.2 respectively which showed that the improvement in backache and leg pain score mildly decreased with time.

As regards to evaluation of functional status ,at 3 weeks ,97.1%(34/35) of patients showed considerable functional improvement of which, 71.4 % of patients showed good functional status(25/35, ODI 0-20%) whereas fair result (ODI 20-40%)was seen in 25.7 %(9/35) of patient. Poor result (no improvement) was noticed in one patient (2.8%) who had initial ODI of 72% (Crippled status) and therefore advised for alternative treatment like surgery. Out of all patients, only 8 patients (22.8%) with moderate functional disability where less subjective improvement of pain was recorded at 3 weeks follow up were given a second dose of epidural steroid injection. At 3 months follow up 77.14%(27 patients/35) of patients showed functional improvement of which with good results in 54.2% (19/35) and fair result in 22.8%(8/35) and poor results in 22.8%(8/35). At 6 months follow up, 68.5%(24 patients/35) of patients showed functional improvement of which with good results were seen in 45.7% (16/35) and fair result in 22.8% (8/35) and poor results in 31.4% (11/35). None of the patients had any major complications.

Discussion

Low backache is a very common complaint for which patients seek out for care of a physician in the outpatient department in a hospital. It is estimated that 3 to 5 % of patients with back pain have true radiculopathy (Tarulli *et al.,* 2007) of the patients with acute pain, about a half recovers within a month or so without any medication or intervention (Miller, 2004). Lumbar radiculopathy is a disorder of the spinal nerve roots, resulting in a dysaesthetic sensation or pain in a pattern of lumbar or sacral nerves. When a nerve is compressed, it causes irritation and subsequent neurologic dysfunction. The pain is neuropathic in nature, whether it is acute or chronic, traumatic or degenerative. Apart from pain, the patient develops a multitude of symptoms such as burning, tingling, weakness, numbness, paraesthesia, dysthesia etc. There are a variety of causes for nerve compression and irritation such as disc bulges or herniations, arthritis, spondylolisthesis, spinal canal stenosis, tumours, or a congenitally narrow spinal canal. The most frequently involved discs are the L4-5 and L5-S1 levels, with the L4-5 disc being more frequent.

A wide variety of treatment procedures ranging from conservative measures like bed rest, analgesics, traction, and ultrasonic therapy to surgery. Whatever the method, the treatment of disc prolapsed essentially remains symptomatic. Studies had documented the effect of epidural steroids in the symptomatic of disc prolapsed as early as 1952 when hydrocortisone was used by Robecchi and Capra (Robecchi, 1952). The rationale for anti-inflammatory treatment with periganglionic steroid infiltration in the relief of the periganglionic inflammation by ensuring recovery of the normal ganglioneural myelin sheath, and hence nerve function at the disease site (Wittenberg *et al.*, 2001; Manchikanti *et al.*, 2009) and is an effective tool for the relief of root pain caused by spondylosis or disk herniation, but the effects appear to be short lived (Gajraj, 2004; Zennaro *et al.*, 1998)

The success rates with epidural steroid injection vary in literature but most studies report a good success rate in short term while the average success rate at 6 months has been 30-49% (Willim *et al.*, 2003). In our study, at 3 weeks, 71.4 % of the cases had good results, while after 6 months; good results were seen in 45.7 % of the cases. However, the percentage of patients who had symptomatic improvement with TESI at 6 months follow up (the total number of good / fair result) was 68.5 %. I t is believed that the local anesthetics inhibit the pain-spasm cycle and reverberating nociceptor transmission while the corticosteroids reduce the inflammation by inhibiting the synthesis or release of pro inflammatory substances (Manchikanti *et al.*, 2000). It is estimated that as much as 40% of back surgeries fail and even in successful surgeries, pain and subsequent disability have returned after a variable period of 6 months to 20 years (Manchikanti *et al.*, 2000).

In this study, no major complications were reported except for local dull ache at the site of injection which was short lived. In conclusion, present study showed that TESI is an effective & economic modality in the treatment of the patients with chronic low back pain in centres where advanced interventions are not available. However, large controlled group for specific evaluation of its effect is recommended.

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