

The Effectiveness of Lumbar Spinal Perineural Analgesia (LSPA) For Various Causes of Low Back Ache

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Abstract:

Background: Back pain is a common medical problem and predominant cause for medical consultations. The concept of lumbar spinal perineural analgesia (LSPA) is to achieve reduction of pain and desensitization of irritated neural structures and not complete analgesia or paralysis of lumbar spinal nerves. This article is intended to study the effectiveness of lumbar spinal perineural analgesia (LSPA) for various causes of low back ache on the basis of degree of pain relief following the procedure.

Materials and Methods: This was a prospective study comprising of 50 patients who had undergone appropriate investigations before assessment for eligibility, confirming the existence of lumbar disc disease and these selected patients underwent lumbar perineural analgesia for different causes of low back ache not relieved with other conservative modalities of treatment. Pre procedure and post procedure, the severity of pain level was assessed with standard verbal rating scale (VRS), with a score of 1 = no pain, 2 = mild pain, 3 = moderate pain, 4 = severe pain and 5 = intolerable pain.

Results: Pain relief was the primary index for evaluating the outcome of the study and pre procedure verbal rating score (VRS) was recorded by the patients and majority of patients were of VRS 4 (Severe Pain) and VRS 3 (Moderate Pain). Immediate post procedure the severity of pain was documented by the patients and then at 1 week and 1 month post procedure. Majority of patient's mean verbal rating scores (VRS) kept decreasing (improvement of symptoms) at follow-up visits.

Conclusion: This procedure seems to be effective when treating patients with low back ache & sciatica as it is easy to perform, less technically demanding and had a low complication rate. It did offer an interesting alternative approach in the management of low back pain and sciatica and advised to perform only if other modalities of conservative management fail.

Key Word: back pain, low back ache, analgesia, lumbar disc disease, follow up.

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I. Introduction

Back and neck pain are a very common medical problem and a common cause for frequent medical consultations^[1]. The reported lifetime prevalence of back pain ranges up to 84%^[2] and that of neck pain to 67%^[3]. Dorsal (thoracic) pain is much less frequent. The 1-year prevalence of dorsal pain was 17% compared to 64% for neck and 67% for low-back pain^[4]. Most of the patients initially presenting with back pain can be managed non-operatively with physical therapy and analgesics and will return to an acceptable pain level within 3 weeks and even to normal within 3 months^[5]. This suggests that spinal pain is a benign and self-limiting disorder. About 85% of patients can be classified as having non-specific back pain i.e. no morphological correlate can be detected which would satisfactorily explain the pain.

The idea of lumbar spinal perineural analgesia is injection of a local anesthetic (possibly mixed with steroids) into the foramino articular region of the vertebral motor segment. The trajectory of injection is determined by topographic and anatomic palpation points^[6]. Various indications for lumbar spinal perineural analgesia (LSPA) include lumbar nerve root syndrome, pseudoradicular syndrome, postdiscectomy syndrome, local lumbar spine syndrome.

Lumbar spinal perineural analgesia (LSPA) is usually not the first line treatment & it should only be performed after appropriate medical treatment, including rest and oral medication for 3 to 4 weeks. It is usually performed on an outpatient basis under fluoroscopic or CT guidance. The basis of lumbar spinal perineural

analgesia (LSPA) is to achieve reduction of pain and desensitization of irritated neural structures and not complete analgesia or paralysis of lumbar spinal nerves [6].

II. Material And Methods

All the patients had signed an Institution Research Board (IRB) approved informed consent form before they got enrolled into the study. Patients underwent appropriate investigations (lumbar spine x-ray, magnetic resonance imaging (MRI) scan) before assessment for eligibility and confirming the existence of lumbar disc disease.

Study Design: Prospective study.

Study Location: This study was done in the Department of Neurosurgery, at Government TD Medical College, Alappuzha, Kerala, India.

Study Duration: 6 months.

Sample size: 50 patients.

Inclusion criteria:

1. Patients with low back ache not relieved with other conservative modalities of treatment such as pharmacotherapy, physical therapy or orthosis..
2. Patients who are capable of quantifying their level of pain using a standard verbal rating scale (VRS), with a score of 1 = no pain, 2 = mild pain, 3 = moderate pain, 4 = severe pain and 5 = intolerable pain.
3. Patients of all age group and both sexes.

Exclusion criteria:

1. Cases with severe motor weakness, rapidly progressing neurological deficits, cauda equina syndrome.
2. Local infection at the site of injection.
3. Allergy to steroids, bleeding diatheses, pregnancy.
4. Uncontrolled hypertension, uncontrolled diabetes mellitus.
5. Patients not willing to undergo investigations and refusing to undergo the procedure.

Procedure methodology

The medications and instrumentation for injection (Fig 1A) were arranged on a sterile table before the patient was positioned. The medications include local anaesthetic (0.5% Bupivacaine, 5cc) and steroid (10mg Triamcinalone). The needle used for injection was a spinal needle (Quincke spinal needle of 23G, 3.5 inches). The patient was positioned in a sitting posture and the procedure performed under image guidance (Fluoroscopic C-arm) for confirmation of the needle position at the desired level of injection.

About 8-10 cm lateral to the midline line at the level of iliac crest, a point was marked depending on the side of symptoms and infiltrated with local anesthetic. From the 60° position directing medially, various angles were chosen along the vertical plane, depending on the affected root (Fig 1B). The needle was inserted at an angle of 0° along the vertical plane in order to target the L3 nerve root and at 30° angle along the vertical plane for the L4 root and to target the L5 nerve root the needle tip angled at 50 to 60° approximately along the vertical plane (Fig 1C). The needle was inserted until bone contact is established on the lateral vertebral body or on the lateral facet.



Fig 1A - Medications and needle for injection



Fig 1B – Site of entry for injection



Fig 1C –Trajectory of the needle for injection

Next the position of the needle at the desired level was confirmed by C-arm guidance and once the needle position was confirmed the drug (local anaesthetic with steroid) was administered but prior to the injection of the drug, frequent mechanical aspiration done since there is a possibility of puncturing a root sheath in the intervertebral foramen. On contact with the nerve root, the patient may confirm a sudden sharp pain radiating into the leg (Fig 1D).

Once the final position of the needle has been correctly established, the drug was completely injected and needle withdrawn and sterile dressing placed (Fig 1E). Following the administration of drug, the patient felt a decrease in the back and leg pain, which was usually sustained.



Fig 1D – Radiographic confirmation of the needle position



Fig 1E – Injection of the drug and final dressing of injection site

Patient was observed for 30 minutes post procedure and discharged with oral NSAIDs such as ketoprofen or piroxicam and oral antibiotics for 3 days. Patients were asked to report immediately in case of complications. Patients were then asked regarding the degree of relief of pain immediately and 1 week and 1 month following the procedure using verbal rating score (VRS) – score of 1 = no pain, 2 = mild pain, 3 = moderate pain, 4 = severe pain and 5 = intolerable pain.

III. Result

A total of 50 patients were enrolled and completed the study with male (n=27) to female (n=23) ratio of 1.2:1 and predominant age group being 30 to 50 years (n=29). Occupations like fishing (n=20), house wife (n=16) and lifting heavy weights by laborers (n=10) were a major contributory factor to the chronic low back pain with sciatica.

Duration of symptoms of low back ache in these patients in the study group were mostly around 6 to 12 months (n=22) before opting for perineural analgesia. Associated hypertension was seen in 28 patients and diabetes mellitus in 17 patients who were included in this study. Smoking was seen in 27 patients and alcohol consumption in 11 patients.

The predominant presenting symptoms of the patients included in the study are summarized in the graph (Fig 2A). Prior to perineural analgesia these patients were tried with other modalities of conservative management such as rest/ analgesics (n=44), orthosis (n=38), physiotherapy (n=40), caudal epidural injections (n=3), traction (n=2).

MRI findings of these patients were predominantly disc degeneration (n=32) followed by disc bulge (n=27) and mostly at L4-L5 level (n=28) followed by L5-S1 level (n=15) with stenosis mostly at neural foramen (n=34).

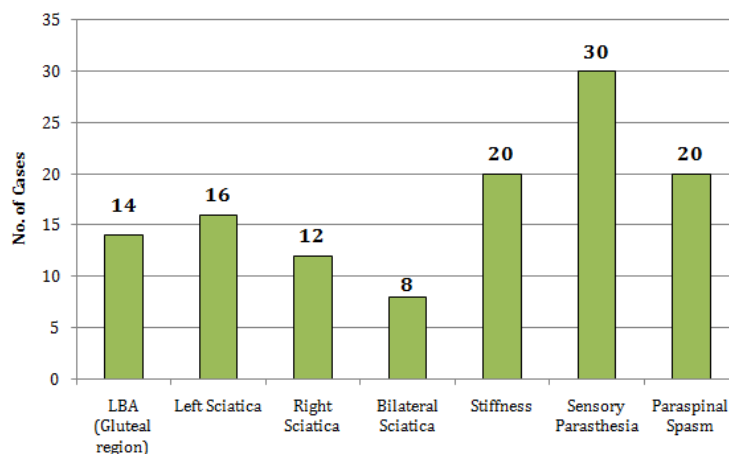


Fig 2A – Predominant symptoms/ signs

Pain relief was the primary index for evaluating the outcome of the study and pre procedure verbal rating score (VRS) was recorded by the patients and majority of patients were of VRS 4 (severe pain) and VRS 3 (moderate pain). Immediate post procedure the severity of pain was documented by the patients and then at 1 week and 1 month post procedure. Patients were found to have reduction in the severity of pain.

The patient's mean verbal rating scores (VRS) kept decreasing (improvement of symptoms) at follow-up visits. At 1 month post procedure the VRS was 1 in 41 patients and VRS was 2 in 8 patients (Fig 2B & 2C).

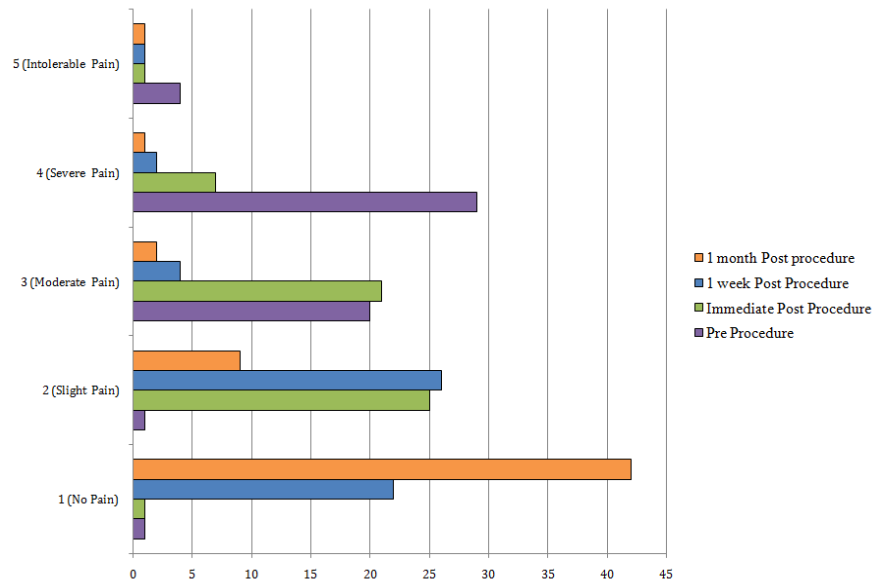


Fig 2B – Verbal Rating Scores (VRS) of patients

No major early or late complications were recorded in these patients, however hypotension was encountered during the procedure and seen in 12 patients and managed promptly by stopping the procedure and monitoring the patient's vital signs, following which a second attempt was made. We found no lower limb dysfunction in terms of loss of sensation and/or reduced motor power, or bladder and bowel dysfunction(s).

The number of patients requiring repeated injections totaled 3 and 2 of them recovered completely, while one patient had no pain relief. A second MRI showed deterioration of the herniation, following which surgical decompression was performed.

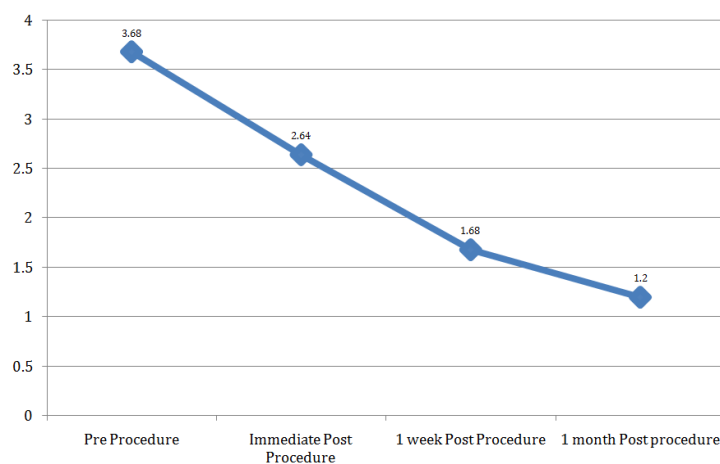


Fig 2C – Improvement of mean Verbal Rating Scores (VRS) of patients at follow up

IV. Discussion

Low back pain accounts for 15% of all sick leaves from work and is the most common cause of disability for persons < 45 yrs age [7]. The prognosis for most cases of low back ache is good and improvement usually occurs with little or no medical intervention. Lumbar spinal perineural analgesia (LSPA) seems to be

effective when treating patients with low back ache & sciatica. It is easy to perform, less technically demanding and has a low complication rate.

Lumbar spinal perineural analgesia (LSPA) offers a relatively simple, rapid and easily performed day-care procedure that can offer significant pain relief. It may even be considered as an alternative to operative procedures in patients not responding well to conservative treatment, high operative risk or when they refuse surgery.

Following injection, patients are discharged; thus avoiding long periods of hospitalization and bed rest. The combination of local anesthetics and steroid could be an additional benefit leading to greater and faster relief during the first week, with improvement noted even at 1 month and later.

The intervention proved to be a much more cost-effective procedure for the patients. However our study does have the limitations of shorter follow up and absence of non interventional control group.

V. Conclusion

The basis of lumbar spinal perineural analgesia (LSPA) is to achieve reduction of pain and desensitization of irritated neural structures and not complete analgesia or paralysis of lumbar spinal nerves.

LSPA may offer an interesting alternative approach to managing low back pain and sciatica and is advised to perform only if conservative management fails.

References

- [1]. Hart LG, Deyo RA, Cherkin DC. Physician office visits for low back pain. Frequency, clinical evaluation, and treatment patterns from a U.S. national survey. *Spine (Phila Pa 1976)*. 1995; 20(1):11-19.
- [2]. Cassidy JD, Carroll LJ, Côté P. The Saskatchewan health and back pain survey. The prevalence of low back pain and related disability in Saskatchewan adults. *Spine (Phila Pa 1976)*. 1998; 23(17):1860-1867.
- [3]. Cote P, Cassidy JD, Carroll L. The Saskatchewan Health and Back Pain Survey: the prevalence of neck pain and related disability in Saskatchewan adults. *Spine (Phila Pa 1976)* 1998; 23:1689-98.
- [4]. Mielainen R, Videman T, Battie MC. Prevalence and characteristics of upper or mid-back pain in Finnish men. *Spine* 2006; 31:1846-1849.
- [5]. Deyo RA, Weinstein JN. Low back pain. *N Engl J Med*. 2001; 344(5):363-370.
- [6]. Klinik V, Sportklinik Viktoria - PIXELHAUS. Injection treatment of the lumbar spine. <https://www.viktoria-klinik-bochum.de/en/services/spine-therapy/minimally-invasive-nonsurgical/injection-therapy-of-the-lumbar-spine/injection-treatment-of-the-lumbar-spine.php>. Accessed June 1, 2020.
- [7]. Cunningham LS, Kelsey JL. Epidemiology of musculoskeletal impairments and their associated disability. *Am J Public Health* 1984; 74:574-9.

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