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Effectiveness of selective transforaminal nerve root injection of triamcinolone with ropivacaine for lumbar radicular leg pain

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Abstract

Background: Selective Nerve Root Block using steroid is a proven technique for management of lumbar radiculopathy. The aim of the study was to determine the effectiveness of selective nerve root block in lumbar radiculopathy.

Methods: A prospective observational study was conducted for duration of one year in patients diagnosed with lumbar radiculopathy. Patients with leg pain, positive straight leg raising test and single level disc prolapse were included in the study. The procedure was performed under fluoroscopic guidance and Visual Analogue Pain rating scale was used for assessment pre-injection, immediate post injection 1 month, 3 months and 6 months post injection.

Results: Total 30 patients with mean age of 37.7 ± 9.31 years were included in the study. In 18 patients, this pain reduction was obtained immediately and in a further 8 patients within 4 days. In 4 patients, the nerve root block did not show a sufficient pain reduction.

Conclusions: Selective transforaminal Nerve Root Block in lumbar radiculopathy significantly reduces Visual Analogue Pain Score post injection.

Keywords: Lumbar; radiculopathy; transforaminal nerve root block; steroid

Introduction

Since its first description by Mixter and Barr in 1934, lumbar disc herniation is one of the few abnormalities in the lumbar spine, where a clear relationship between the morphological alteration and pain seems to exist.

- While pure mechanical compression was considered previously as a source of sciatica, there is increasing evidence that chemical irritation of the nerve root plays an essential and perhaps even more important role.
- Autoimmune responses, microvascular changes and inflammatory reactions are discussed as potential causes of this phenomenon.
- Nucleus pulposus tissue has inflammatory properties, which lead to an intraneural oedema, a very important factor in the pathogenesis of sciatic pain.
- The negative effect of nucleus pulposus on the nerve root can be significantly reduced by the application of methylprednisolone. The compromising of the nerve conduction velocity by nucleus pulposus tissue seems to be self-limiting.

Aim

The aim of our study was to investigate effectiveness of selective nerve root block with Ropivacaine and triamcinolone in patients with radicular leg pain.

Methodology

A prospective study of 30 patients attended to Navodaya Medical College out-patient Orthopaedic department from July 2018 to June 2019, with follow-up of minimum 6 months.

- In those patients who presented with low back ache and radicular pain distribution and without neurological deficits, the distribution of the radicular leg pain in relation to the sensory dermatomes defined and confirmed by clinical and radiological (MRI) evidence.

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with minimum 3 months conservative management

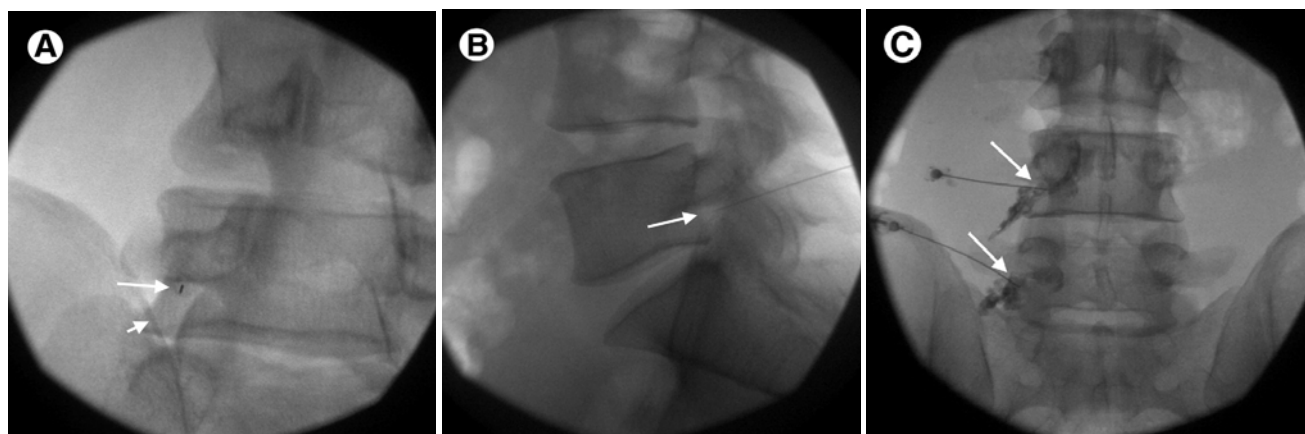
- Relevant motor and sensory deficit, canal stenosis, suspected cauda equina syndrome patients, previous spinal surgery patient are excluded
- Investigation before doing procedure
 - Complete blood count
 - HIV
 - HBsAG
 - X-ray LS spine
 - MRI

Technique

Patient kept nil by mouth for 6 hours and took to OT

- Patient placed in prone position on OT table.
- Intravenous fluids were connected and precautionary measures are kept ready to manage neurogenic shock and anaphylactic reactions
- Aseptically prepare the skin area with isopropyl alcohol and povidone-iodine several segments above and below the interspace to be injected.
- Drape the area in sterile fashion, Under AP & lateral fluoroscopic guidance, identified the target interspace.
- Anesthetize the soft tissues over the lateral border and midway between the two adjacent transverse processes at the target interspace.

- Insert a 22-gauge, and advance it within the anesthetized soft tissue track under fluoroscopy until contact is made with the lower edge of the superior transverse process near its junction with the superior articular process.
- Retract the spinal needle 2 to 3 mm, redirect it toward the base of the appropriate pedicle, and advance it slowly under fluoroscopy.
- Adjust the C-arm to a lateral projection to confirm the position, and then return the C-arm to the AP view.
- Remove the style. Inject 1 mL (urografin 76%) of nonionic contrast agent slowly to produce a perineurosheathogram
- After an adequate dye pattern is observed, inject slowly a 3mL volume containing 2 mL of 0.5% preservative-free ropivacaine and 1 ml/40mg t triamcinolone.
- Patient was observed for 15 min after SNRB, the clinical examination and VAS score recording was repeated.
- Patient was shifted to post-operative ward and 2 shots of iv antibiotics (pre and post procedure) was given
- The clinical follow-up was at 2–3, 6 and 12 weeks and 6 months after injection.
- A successful nerve root block was defined as reduction of the leg pain of more than 60% within the first 4 days.
- This time interval was chosen because the effect of the steroids is not immediate.



Fluoroscopic-guided lumbar transforaminal nerve root block. Two roots are ultimately injected in this patient. (A) Approach for needle placement adjacent to the L5 nerve root. The nerve root exits just beneath the named pedicle. After initial AP positioning and with cranial-caudal angulation to align the disk, the C-arm is oblique to establish the trajectory. After local anesthetic, a 25-g spinal needle is directed just beneath the L5 pedicle (arrow). Note how the iliac crest can overlap the trajectory compromising access to the foramen or disk space (arrowhead). (B) Lateral fluoroscopic image confirms needle position just anterior to the facet and beneath the pedicle (arrow), correctly located in the neural foramen. (C) Second needle was also placed adjacent to the L4 nerve root. Contrast injection observed with AP fluoroscopy confirms epidural location of the tips of the needles with contrast tracking along the nerves (arrows) as well as entering the epidural space locally.

Results

The average follow-up was 6 months

- At 2 to 3 weeks' follow-up, 26 of 30 patients reported successful pain reduction.
- In 18 patients, this pain reduction was obtained immediately and in a further 8 patients within 4 days.
- In 4 patients, the nerve root block did not show a sufficient pain reduction despite a correct periradiculogram.
- In 5 of the patients with initial pain relief (n = 26), the nerve root block had to be repeated in between 2-3 months after, since the first nerve root block did not have the expected success.
- Three of the latter 5 patients had a subsequent permanent pain reduction further 6 months follow up.

- In total with 15 months of follow up 26 patients with pain relief after the first and/or second injection had a permanent and substantial pain reduction, 16 did not require surgery, 4 had disc herniation and the remaining 6 had foraminal stenosis. (4 laminectomy, 6 foraminal decompressions).

Conclusion

All individuals who had an immediate pain relief (>60%) after the injection but recurrent symptoms had successful surgery with complete relief of the leg pain.

- There were no complications, in particular no infections, nerve root injuries or bleeding events.
- Surgery in patients presenting with a radiculopathy with or without minor neurological sensory/motor deficit is

only required, if the initial pain cannot be well controlled by non-operative means. Otherwise, surgery is not required because spontaneous recovery can be expected

- Because a positive treatment effect could be demonstrated by our study analysis, the therapeutic efficacy of a nerve root block deserves further exploration by randomised double-blind studies.

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