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Efficacy of selective nerve root block in the management of lumbar radicular leg pain: A prospective study in Indian population

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Abstract

Lumbar radiculopathy is a very common problem encountered in day to day practice of every orthopaedic surgeon. Management of this problem varies from only conservative management to complete surgical decompression. Spinal steroid injections also play a role in the management of low to moderate grade of disc disease. Selective nerve root block (SNRB) is a form of directed steroid injection around a particular nerve root. In this study we have evaluated the efficacy of SNRB in a single level disc disease. We found that SNRB is an effective intermediate form of treatment between conservative management and Surgery. Though it produces a significant improvement in pain and disability scores initially, after three months there are chances of recurrence for which surgical management would be required.

Keywords: selective, root block, lumbar radicular, pain, Indian population

Introduction

Chronic lumbar radiculopathy is defined as a pain in the back and leg with accompanying sensory or motor deficits in a nerve root distribution lasting for more than 12 weeks [1-4]. The lifetime prevalence of lumbar radiculopathy has been reported to be 5.3% in men and 3.7% in women [5-6]. Selective Nerve Root Block (SNRB) is an established form of treatment in the management of radicular pain due to a particular affected nerve root in both. Cervical and lumbar regions [11-12]. Lumbar radiculopathy is a result of combined mechanical and inflammatory effects. Mechanical lesions include various stages of disc prolapse, ligamentum flavum hypertrophy, facet hypertrophy and degenerative osteophytes causing foraminal stenosis [7]. Inflammation of the affected nerve roots is a result of the exposed nucleus pulposus which contributes to the nerve root pain [13]. The principle behind this technique is to reduce inflammation of the nerve root by injecting a steroid and thus reducing the intensity of pain. Our aim is to study the prognosis after single dose of SNRB over affected lumbar nerve roots and find out whether a window period of reduced pain be achieved before proceeding to next line of management.

Materials and Method

This is a prospective study which was conducted in the department of Orthopedics ESIC medical college hospital Gulbarga from May 2016 to May 2018. Thirty patients presenting with low back ache and radiculopathy, with MRI showing single level unilateral disc herniation were included in the study. Written informed consent was taken from all those included in the study. Inclusion criteria were patients with a single level disc herniation who failed to respond to conservative management of 6 weeks. Conservative management included use of analgesics, muscle relaxants and guided physiotherapy. Exclusion criteria were patients with significant ligamentum flavum hypertrophy, bilateral foraminal stenosis, multilevel disc herniation, previous spinal surgery or patients who have received spinal steroid injections within 3 months. Patients who had contraindication to steroid injections like diabetes, renal disorders etc were not included. Patients with a fractured spine or having other congenital anomalies were also excluded. Pregnant and lactating females were also not included in the study.

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Inclusion Criteria	Exclusion criteria
Age between – 18-50years	Bilateral foraminal herniation
Unilateral leg pain	Multilevel disc herniation
MRI- single level unilateral disc herniation	Previous spinal surgery
Failed conservative management of 6 weeks	Patients receiving spinal steroid injections within 3 months
	Comorbid conditions: Renal disorders, Diabetes
	Spinal fractures
	Congenital spinal anomalies
	Pregnant and lactating mothers

A Consort diagram for the study was prepared. The pain scoring was done using the Morris scoring system. Only 20 clinically relevant points of the scoring system were used. Considering significant decrease in the VAS scores and decrease in the Roland-Morris disability questionnaire (RMDQ) score as a measure of improvement [16]. Using a paired t test and significance level of 0.05, sample size of 30 patients was decided. Patient details and the pain scores were recorded in a prefixed proforma. Blood investigations were done and the physician fitness obtained for all the patients before the procedure. All SNRB injections were given by a single orthopedic surgeon under C-arm guidance.

Technique for nerve root blocks

Patient is positioned prone on the OT table and the part was prepared and draped. The level was identified under the C-arm and the area was infiltrated with 10ml lignocaine 2%. A 20 gauge spinal needle was used which was directed towards 6’O clock position of the ipsilateral pedicle in anteroposterior view and towards the neural foramen, inferior to the pedicle in lateral view. After confirmation under the C-arm 2 ml of radioopaque dye (iodopaque) was injected to identify the root in both anteroposterior and lateral views. After confirmation 80 mg of triamcinolone mixed with 5 ml of 5% bupivacaine and 4 ml of distilled water was injected around the root.



Fig 1 A: MRI showing mild grade of disc prolapse. **B:** Moderate grade disc prolapse.



Fig 2a: Spinal needle inserted after confirming the level under C- arm.



2b: c arm position for lateral view



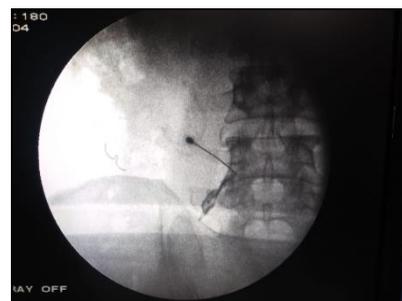
2c: Position of the needle in AP view- 6’o’ clock position under the pedicle



2d: Position of the needle in lateral view- directed towards the neural foramen.



2e: C-Arm image in lateral view. Spread of dye



2f: C- arm image- Spread of the dye in AP view

Post injection Protocol: Patient was shifted to the ward after injection and was kept under observation for 6 hours. Any drug

reaction or adverse effects were recorded. Unless there was any complication all patients were discharged on the same day. Oral antibiotics for 2 days were given, however no analgesics were given unless patient had severe pain. RMDQ scores and VAS scores were recorded 4 hours after the injection before the patient was discharged. Next follow up visits were on 2 weeks, 1 month and 3 months. A scores were entered in a database at each follow up and the final statistical analysis was done at the end of the study.

Statistical analysis

All the statistical analysis was done using the standard SPSS software. The student's t test was used as the test of significance. A p value of less than 0.05 was considered to be significant.

Results

They were total 30 patient (male18:femle12) the age of patient ranging from 19yrs to 60yrs the mean age was 38.5 years (Table 1). The average height was 163.8 (range: 140– 180 cm). The average weight was 70.65 (range: 62–99) kg. The demographic profile SNRB was show in table 1. Intervertebral disc prolapse was seen at L1–L2 level in 6 cases, at L3–L4 level in 11 cases, at L4–L5 level in 10 cases, and at L5–S1 level in 3 cases. The pain rating was done using VAS score and Roland Morris before the procedure. Straight leg raising test was done on the affected side and was positive on 14 patient.

The initial mean VAS score was 6.9. There was significant improvement in each follow up with a 11% reduction in VAS scores at the end of 3 months (Table 2). At 3 months the difference in the VAS scores was significant compared to the pre-injection Values (p val – 0.039). The pre injection RMDQ scores were 14. There was significant improvement in the score immediate post injection, 2 weeks, and 3 months (p val <0.05) (Table 3). However at the end of 3 months the difference ws not significant (p val-0.28). Two patients complained of severe pain at the site of injection for which injectable analgesics were given. One patient had two episodes of vomiting and giddiness which subsided on its own. No patient was lost in follow-up.

Table 1: Showing demographic data of studied patients.

Demographic parameter	Mean	Range
Age (year)	38.5	18–62
Weight (kg)	70.65	62–99
Height (cm)	163.8	140– 180 cm

Table 2: Improvement in the VAS scores at each follow up

	SNRB	Improvement
Mean Pre injection scores	6.9±1.2	
Mean Post injection scores	4.03±1.08	41.59 (p val- 0.001)
2 nd week	4.5±1.1	34.7 (p vl-0.001)
1month	5.36±1.13	22.3 (p val- 0.002)
3month	6.13±1.4	11.15 (p-val-0.0397)

Table 3: Improvement in the RMDQ score

	SNRB	Improvement
Mean Pre injection scores	14 ± 3.5	
Mean Post injection scores	4.9± 5.2	65% (p val -0.001)
2 nd week	5.2±3.2	63% (p val – 0.001)
1month	7.5 ±7.13	46% (pval – 0.002)
3month	8±4.10	42% (pval- 0.28)

Discussion

Low back pain with lumbar radiculopathy is very commonly seen in orthopaedics clinic. There is a steady increase in the

incidence of patients with this condition in our daily practice. Conservative management in these patients should always be tried before attempting any form of surgical or non-surgical treatments. Conservative management includes guided physiotherapy including Ultra-Sonics and microwave diathermy, oral or injectable analgesics, steroids and neuromodulator drugs like pregabalin and its derivatives.

If patients fail to respond to the conservative treatment spinal injections can be attempted. These include central epidural injections, transformational injections (SNRB), caudal injections etc. These injections provide a middle path between conservative management and surgical decompression. Many steroids have been used in spinal injections. Many surgeon use methyl prednisolone based preparations for this purpose [14]. Triamcinolone and betamethasone based preparations are also in use [15]. We have used triamcinolone in our study. Steroids act by reducing the perineural oedema and control of inflammation. This gives the nerves space to breathe and thus reduces the radicular pain.

Sudhir singh *et al.* conducted a comparative study between SNRB and caudal epidural steroids in eighty patients [9]. They found that caudal steroid produced better results compared to SNRB. This study had numerous loop holes s pointed out by Mohammed Sadiq *et al* [17]. They used three doses of caudal steroid compared to only one dose of SNRB. This study did not provide any intergroup comparison to between the caudal and epidural steroid injections. Arun Kumr *et al.* studied the improvement in RMDQ scores following the SNRB injection in a group of 40 patients. They found that SNRB provides only short term relief and recurrence of symptoms are expected. They also compared the effects of SNRB in varying grades of disc herniation and found that SNRB did not help in patients with severe grade of disc herniation [8].

In our study we found that there was a significant improvement in the pain scores at the end of 3 months. We found that the improvement in the RMDQ scores was maximum in the immediate post injection period, thereafter there was a gradual decline in the improvement and at the end of three months the improvement in the RMDQ scores was not significant. However the improvement in the VAS score remained significant at each follow up till the third month. Considering no major adverse effects we find that this is an effective form of treatment in the management of mild to moderate grade of lumbar canal stenosis.

Conclusion

SNRB is an effective treatment modality in patients with mild to moderate grade of disc disease. It provides good pain relief but the effects are short lasting with likely recurrence of the symptoms after a pain free interval of 3 months. It provides an intermediate treatment option between conservative management and surgical decompression. Considering that it is associated with very few side effects, it can always be tried in patients as a trial before planning for surgery. Thus it provides an effective and economical treatment option in mild to moderate grade of disc disease.

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