International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2019; 5(3): 191-199

www.orthopaper.com
Received: 11-05-2019
Accepted: 15-06-2019

Dr. Saurabh Vashishtha
Department of Orthopaedics, Jawaharlal Nehru Hospital and Research Centre, Bhilai, Chhattisgarh, India

Dr. Sandeep Kumar Singh
Department of Orthopaedics, Jawaharlal Nehru Hospital and Research Centre, Bhilai, Chhattisgarh, India

Dr. Ankush Verma
Department of Orthopaedics, Jawaharlal Nehru Hospital and Research Centre, Bhilai, Chhattisgarh, India

Dr. Abhishek Anand
Department of Orthopaedics, Jawaharlal Nehru Hospital and Research Centre, Bhilai, Chhattisgarh, India

Correspondence
Dr. Saurabh Vashishtha
Department of Orthopaedics, Jawaharlal Nehru Hospital and Research Centre, Bhilai, Chhattisgarh, India

A study on effectiveness of selective nerve root blocks in lumbar radiculopathies

Dr. Saurabh Vashishtha, Dr. Sandeep Kumar Singh, Dr. Ankush Verma and Dr. Abhishek Anand

DOI: https://doi.org/10.22271/ortho.2019.v5.i3d.1530

Abstract
Background: Low back pain is one of the most common reason for visit to a doctor & young age morbidity, disability, work absenteeism constitutes almost 40% of all occupational risk factors. Lumbar radiculopathy with or without neurological deficits are managed with variety of conservative or operative measures, and generally recovers well. Selective nerve root blocks (SNRBs) having diagnostic or therapeutic use, are popular and advantageous to avoid uncertain potential surgical complications. Aim of this study is to establish therapeutic efficacy and evaluate complications following selective nerve root blocks.
Materials and Methods: The present study was a randomized, prospective study carried out from August 2016 to March 2018, on 50 cases satisfying the inclusion criteria following complete assessment, received selective nerve root blocks. Patients were assessed for pain relief and disability reduction.
Result: Evaluated with VAS and ODI score. In study, immediate improvement of VAS score was 33.04%, 45.3% at 1week, 59.8% at 4weeks and 66.9% after 3months. Reduction in ODI score was 37.7% till 1week, 54.8% till 4weeks and 66.8% till 3months follow up periods.
Conclusion: SNRB is an important, effective, less expensive and less invasive treatment modality to provide lasting therapeutic benefit, allowing the patient to participate in life style modifications, physiotherapies and early resumption of routine activities.

Keywords: Selective nerve root block, low back pain, lumbar radiculopathy

1. Introduction
Low back pain (LBP) is an important clinical, social, economical, and public health problem affecting the population indiscriminately [1]. LBP is not just a disease but a symptom, a syndrome with combination of multiple possible abnormalities of anterior & posterior longitudinal ligaments, vertebral body, synovium, chondropathy/ osteoarthritis of articulating facets joints, sacroiliac joint, nerve roots & foramen, paraspinal muscles, related connective tissues e.g. ligamentum flavum, spinal canal, intervertebral disc at annulus ring. It may be due to mechanical, non mechanical, referred pain, psychological & failed back surgery (FBSS) [2].
Consequently, the vast literature available on LBP is not only heterogeneous but also contradictory (Manchikanti, 2000) [3]. According to a report of World Health Organization in 2002, LBP constituted 37% of all occupational risk factors which stands first rank among the disease complications caused by work. Such high prevalence of complications at international levels has made the World Health Organization to name the first decade of the third millennium as the "decade of campaign against musculoskeletal disorders (As the silent epidemic)" (WHO, 2005).
In western countries like USA, back pain is considered to be a leading cause of disability. The one year prevalence of LBP has been found to be 10-56%, whereas point prevalence of chronic LBP is 15% (Manchikanti, 2000) [3] (Deyo *et al*., 1991) [4], being one of the commonest reason for visit to a doctor & young age morbidity/ disability/ work absenteeism. In a review Volinn [5], 1997 has shown lower prevalence rates of LBP amongst low-economic countries compared with Western countries, especially amongst rural populations. Volinn [5] (1997) also highlighted the fact that the 22 high-economic countries, on which the research work has largely focused, constitute less than 15% of the world's population.

However, epidemiological studies from Tibet (Hoy *et al*., 2003) [6], Turkey (Cakmak *et al*. [7], 2004; Gilgil *et al*. [8], 2005) and China (Barrero *et al*. [9], 2006) etc. suggest that prevalence rates are not that differ from Western countries with one year prevalence in adults in these studies between 36% and 64%.

LBP can interfere with an individual's ability to work, have a meaningful and active social life, and negatively affects overall quality of life (Dunn & Croft, 2004) [10]. This would suggest that back pain is likely to be an increasing health problem in non-Western countries as well. Unfortunately LBP is not considered as a cause of disability and there is scarcity of data available on this rapidly growing epidemic in developing countries such as India. Thus, this review aims at describing the epidemiology of LBP in terms of prevalence, demographic features, risk factors, impact and health care service utilization for LBP in Indian context.

The natural history of chronic lumbosacral pain is favorable and typically resolves with conservative management which includes activity modifications, physical therapy, progressive exercise, non-steroidal anti-inflammatory drugs, spinal injections, radiofrequency ablation therapy or may need surgical intervention. Nucleus pulposus tissue has inflammatory properties, which leads to an intraneural edema, a very important factor in the pathogenesis of chronic lumbosacral pain and radiculopathy. The negative effect of nucleus pulposus on the nerve root can be significantly reduced by the application of steroids like methylprednisolone (Hui *et al*., 2005 and Mistry *et al*., 2013) [11, 12].

Patients with lumbar radiculopathy and minor neurological deficits generally recover well regardless of whether they are managed non-operatively or operatively [13]. Based on this, to avoid the potential complications of surgery, in 1971, Macnab [14] described selective nerve root blocks (SNRBs) first, which have become increasingly popular. SNRBs can be employed with diagnostic or therapeutic intent. The use of selective nerve root block has also been shown to provide permanent to temporary symptomatic relief in cases of both vertebral disc prolapse and spinal stenosis [15, 16, 17].

Despite the widespread use of SNRBs, there is still a debate and lack of evidence about whether injection of local anaesthetic [18, 19, 20] alone or a combination of steroids and local anaesthetic [21, 22] is most effective at relieving symptoms. The external validity of meta-analyses and critical appraisals would also need to be questioned, given the potential for unaccounted variability in study designs [23].

2. Materials and Method

This was a prospective, observational study conducted on 50 patients from August 2016 to March 2018, at J.L.N. Hospital & Research Centre, Bhilai (C.G). Here, all low back pain (lumbosacral) patients satisfying the inclusion criteria and willing to take part in the study were included.

2.1.1 Inclusion criteria

- Age 20–60 years
- All patients with complaint of low backache, radiculopathy, unilateral or bilateral
- Cases refractory to conservative treatment for at least 3 months analgesics, rest or physiotherapy
- Lumbosacral, radicular pain as a result of prolapsed intervertebral disc, ligamentum flavum hypertrophy, lumbar stenosis
- Positive SLRT

2.1.2 Exclusion criteria

- Age more than 60 years
- Patients with motor weakness, rapidly progressing neurological deficits, cauda equina syndrome, claudication and with facetal arthropathy
- Failed back syndrome
- Bleeding diathesis
- Pregnancy
- Systemic disease such as uncontrolled diabetes or any other source of infection; Organic diseases such as lupus, rheumatoid arthritis, cancers; Psychiatric disorders.

2.2 Methodology

After obtaining written informed consent from the selected patients, demographic data, chief complaints, presentation and history was obtained through an interview. General physical examination, local examination for spine and neurological assessment was done. The intensity of pain assessed using Visual analog scale (VAS) [24] score and the disability with Oswestry Disability Index Score (ODIS) [25]. These findings were recorded on predesigned and pretested proforma.

Routine blood investigation including Complete blood count, Renal profile, Liver profile, Urine examination, Random blood sugar, Bleeding time/Clotting time, PT/INR and Radiological assessment viz X-ray Lumbosacral Spine (AP and lateral view) and MRI of lumbosacral spine were done in all the cases.

Materials required

A pre-set trolley with cover, containing the following was kept ready for use.

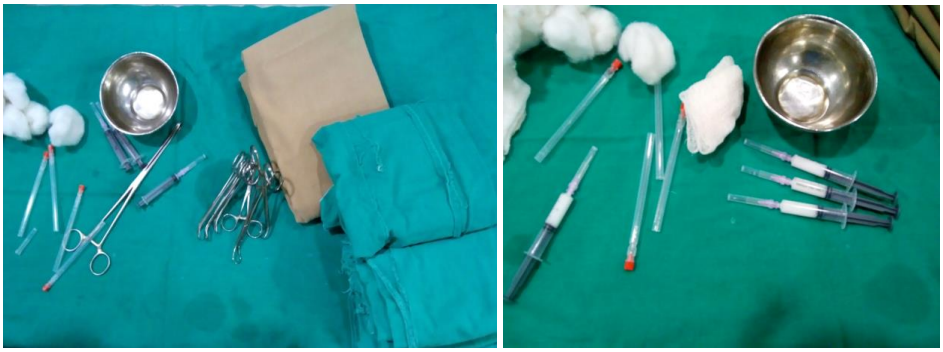
a) Drapes**,** Sponge Holding Forceps**,** Towel clips, Swabs, Bowl
b) Syringes
i. 10 mL – For Local Infiltration with preservative free Xylocaine 1%
ii. 2 ml – For 1ml (40mg) of methylprednisolone (Depo-Medrol) and 1ml of 0.5% bupivacaine
c) Needles
i. 3½-inch 25-gauge spinal
ii. Other Hypodermic needles (Local infiltration)

Other Materials kept ready were steroid- Methylprednisolone (40 mg / ml), 0.5% Bupivacaine, 2% Xylocaine without adrenaline, Rectified Spirit, Povidone Iodine, C-Arm fluoroscope.

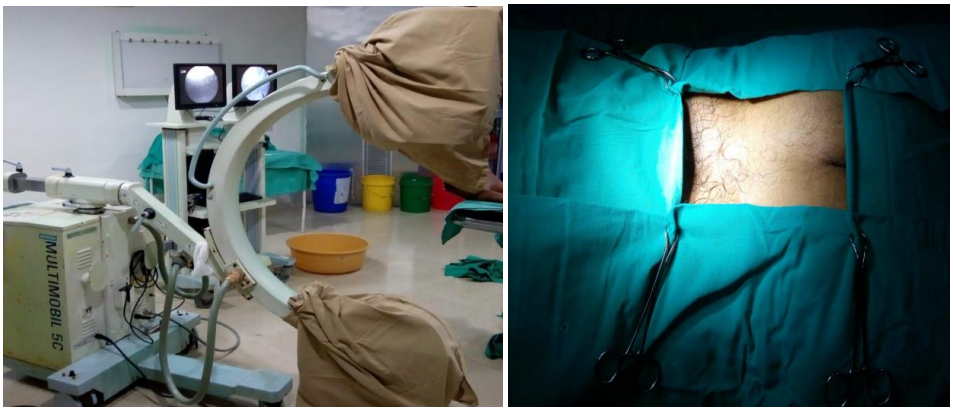
Preparation and position of the patient

Patient positioning prone on a radiolucent table, with C‐ arm fluoroscope on the side opposite to the affected limb, and the surgeon positioned on the affected side, anteroposterior (AP) and lateral views obtained with the C‐ arm, to obtain a clear view of the spinous processes, disc spaces, and pedicle at the level determined clinico radiologically. Markings were made over the spinous process in the midline (AP view), disc spaces in AP and lateral view and pedicle in the AP and lateral view. The skin area was prepared aseptically, from the thoracolumbar junction to the coccyx and parts will be draped. Local infiltration with 2% xylocaine is done in the superficial and muscular planes at and around the entry point. Long spinal needle 25G directed at 45°, introduced from the entry point marked before, aiming at upper part of neural foramen beneath the pedicle, under fluoroscopic control in the triangle of safety. Placement was checked using the fluoroscopy and provocation of the patient's symptom, paresthesia along the course of the radicular pain when the

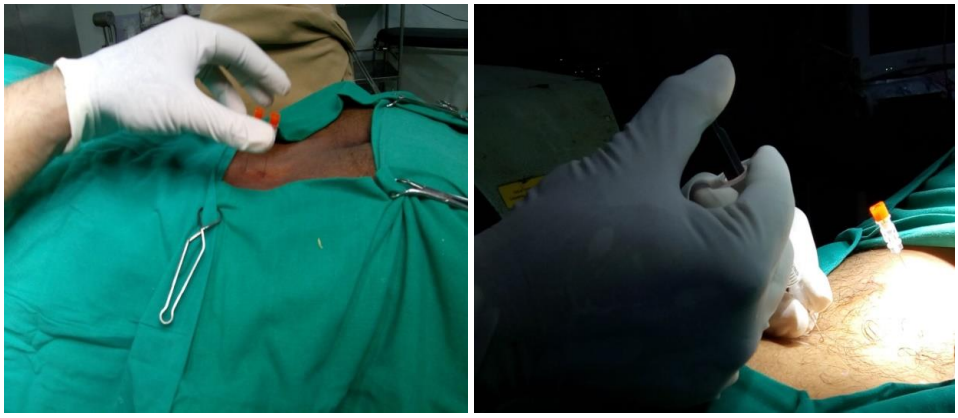
needle touches the nerve. Due to this we were very cautious not to handle the needle vigorously to prevent injury to the nerve. Once the fluoroscopy and elicited paresthesia confirmed the position of needle, needle was slightly withdrawn, the stylet was removed and aspirated to check for blood or spinal fluid and the drug was then injected.



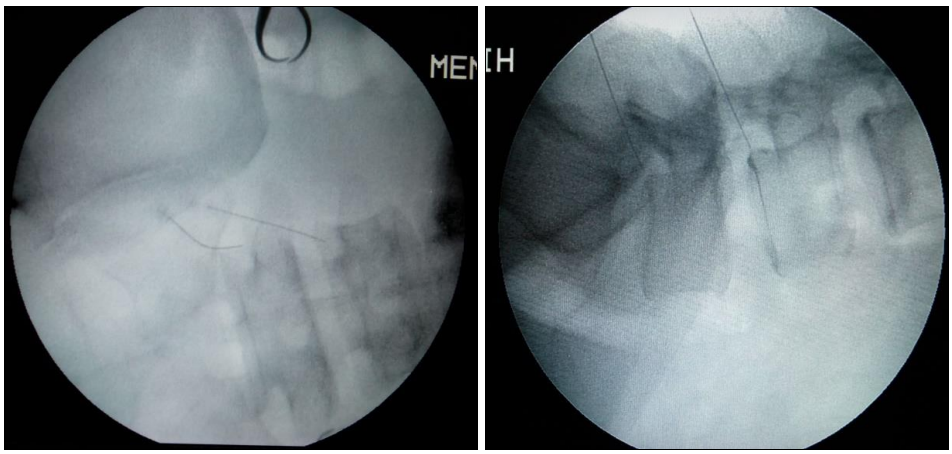
Spinal Trolley, Prepared syringes and spinal needles



C-arm fluoroscope and draping



Needle placement under fluoroscopic guidance and injecting drug



C-arm images showing needle placement in AP and Lateral views

The patient was advised to stay in ward for a 24 hours after the injection which helps to monitor vitals and any dreadful complications. Clinical evaluations were performed immediate post injection, one week (First follow up), 1month (Second follow up) and finally at three months (Third follow up). Immediate post injection evaluation included VAS. During the first, second and third follow up patients were assessed for Visual Analogue Score [24], Oswestry Disability Index score [25]. Those with unchanged symptoms and recurrence went for a subsequent decompression surgery and remaining patients were warned about recurrence of symptoms.

3. Results

The present study consists of evaluation and role of selective nerve root block in Low back pain and radiculopathy at JLN Main hospital and Research Centre, Bhilai, Chhattisgarh, from August 2016 to March 2018. While assessing the demographic characteristics of the study population it was observed that age of the patients was in the range from 20years to 60years with mean age of 39.68 ± 8.85 years. Maximum number of patients belong to age group of 31-40 years i.e. 19 out of 50 patients (38%) and there was male preponderance with the ratio being M: F = 2.33:1. Maximum no. of patients appeared and intervened in less than 1year of duration i.e. 41(82%) out of 50, among which 20(40%) were having symptoms for less than 6months and 21(42%) in 7-12 months with mean duration of pain 9.56 ± 5.85 months. most of the patients reported bilateral radiation i.e. 18(36%) out of 50. 15(30%) patients were having right and 17(34%) with left sided radicular pain.

MRI findings revealed abnormalities in L4-L5 intervertebral disc among 17(34%) patients, at L5-S1 in 10(20%) and maximum at L4-L5-S1 i.e. 18(36%). Only 5(10%) patients were presented with multiple disc involvement. Patients were presented with pain in the range of nagging, uncomfortable, troublesome pain type to worst possible, unbearable, excruciating pain with mean VAS score 7.02 ± 1.31. Most of the patients i.e. 33(66%) out of total 50 were in the range of VAS score 7, 8 & 9 showing intense, dreadful, horrible pain. On assessment of disability under ODI scoring showed that maximum no. of patients were severely disabled for their day to day activities i.e. 68% patients were having severe to bed bound disability according to ODI with pre-procedure mean disability ODI score of 49.88 ± 17.18.

The improvement of mean VAS scores immediately post SNRB with respect to initial pre-procedure values were noted. The mean VAS score were significantly less after block (4.7 ± 1.32) as compared to pre procedure (7.02 ± 1.31) ($p<0.001$). The intensity of pain and disability of the patients during subsequent follow ups was observed as, the mean VAS score and ODI scores were significantly less in follow up compared to pre-procedure mean values of scores ($p<0.050$) respectively. However, except for mean ODI score ($p=0.003$), mean VAS scores for final follow up (3 months) was not significant as compared to 2nd follow up (4 weeks)($p=0.08$).

While 17(34%) patients were having pain VAS ≥5 in first follow up at 1week, the no. reduced to 1(2%) after second follow up at 4weeks and in final follow up at 3months 5(10%) patients get increased pain. On disability assessment in population, 34 (68%) out of 50 patients were severely disabled to bed bound before applying block, according to the ODI scoring system, which consistently improved over subsequent follow ups as 6 (12%) patients at 1 week (first follow up) and only 1 (2%) patient at 4weeks (second follow up) and 3 months (final follow up) remained in ODI severe disabled category. No patients were found crippled or bed bound at follow ups.

In this study, only 13 patients out of 50 were presented with complications just after the block where pain at injection site was observed as the most common complication with 11 (22%), followed by increased radicular pain and nausea incidence in 2 (4%) each. One patient was in common with these three complications. None of the patient was observed with headache, vomiting or any dreadful complications like infection, hematoma or central and spinal cord infarctions.

4. Discussion

The management of low back pain is a challenge not mere to the orthopaedic surgeons but also for anaesthesiologists in pain clinics and neurosurgeons because of its increased incidence, chronicity and hampered social and professional life of patients. Certainly, a variety of treatment methods, conservative or operative, are available, which have to be individualized to the patient depending upon patient's age, chronicity and severity of the symptoms, underlying pathology, functional needs of the patient, compliance to life style modification and at last but not the least patient's choice for the treatment.

Along with mechanical compression of nerve roots, lumbar radiculopathy can be triggered by different proinflammatory chemical agents, causing ectopic neuron firing. Steroids injected into the epidural space or around the affected nerve root are thought to inhibit these inflammatory mediators. On searching a wide database, results found were inconclusive and controversial about the diagnostic and therapeutic efficacy of SNRB, even steroids and placebo. By virtue of this study we attempt to evaluate the effectiveness of one of the semi-conservative treatment option, selective nerve root block in low back pain and radiculopathy in our set up.

In our study maximum patients were aged between 31 to 40 years i.e. 19(38%) patients and 41 to 50 years, 17(34%) patients with average age 39.68 ± 8.85 years in study population with minimum 20 years age to maximum 60 years of age.

In literature also, our age distribution findings were similar to Sudhir Singh *et al.* [26] series with mean age of 36.48 ± 10.5 years, in total 80 patients with range of 18 to 62 years. In Anne Thackeray *et al.* [27] study total participants were 44 with mean age of 38.5 ± 11.6 years. In Mistry *et al.* [12] series total 100 patients were included with 82 patients treated with SNRB, maximum number of patients were found in age group of 31 to 40 years (41%) with mean age of 41.7 years. In Joohyun Kim *et al.* [28] series of 34 patients undergone SNRB, the mean age was 46.1 ± 11.4years. Arun Kumar K *et al.* [29] studied on 40 patients, between age of 23 to 61 years, with mean age being 42.6 years.

The LBP is more widespread in industrialized societies and among functioning population. The most affected age group being fourth and fifth decade of life when degenerative changes of spine are very common. Sciatica usually occurs in patients during the fourth and fifth decades of life; the average age of patients who undergo lumbar discectomy is 42years [30].

Our observation the male preponderance, with 35 (70%) male patients and 15 (30%) female patients among total of 50, with ratio of 2.33:1 is quite differ from literature, as it says, low back pain can affect sooner or later almost everyone in life, both males and females are equally affected but in those older than 60 years, incidence of LBP is more among females as

compared to males [30, 31]. In Sudhir Singh *et al*. [26] series, total of 80 patients, 49 were men and 31 were women, with ratio of 1.58:1. While in a study by Anne Thackeray *et al*. [27] out of total 44 patients, 64% were males, with male and female ratio being 1.77:1 but this ratio is almost 1:1 in Mistry *et al*. [12] study. In results of Joohyun Kim *et al*. [28] study a group of 34 patients having SNRB, 14 (41%) were female with ratio M: F=1.43:1. Surprisingly, Arun Kumar *et al*. [29] study had 9 males and 31 female, with ratio 0.29:1.

During initial assessment, 41(82%) patients were having symptoms for less than 1year, among which 20(40%) for less than 6months and 21(42%) for 7-12 months, with mean duration of pain being 9.56 ± 5.85 months. Most of the patients 18(36%) were having bilateral radiating pain while 15(30%) had right and 17(34%) had left radiation of pain with mean VAS score of 7.02 ± 1.31. Almost all patients were having pain ≥ 5 on VAS score from nagging uncomfortable, troublesome pain to worst possible, unbearable excruciating pain.

In Sudhir Singh *et al*. [26] study, mean duration of pain was 15.07 ± 3.3 months (range 9-26 months) among SNRB group patients with mean initial VAS 7.65 ± 0.5. Joohyun Kim *et al*. [28] study reported the mean duration of pain as 3.8 ± 4.7 months with mean VAS score for leg 4.3 ± 1.0 and VAS score for back 2.6 ± 1.4 in the nerve block group. Arun Kumar *et al*. [29] reported pre-procedure pain with mean numeric rating of pain NRS [32] i.e. 8, on doing SLR on the affected side. This scale asks the patient in pain to assign a number, from 0 to 10, to the severity of their pain.

In this study MRI findings revealed abnormalities in L4-L5 intervertebral disc among 17(34%) patients, at L5-S1 in 10(20%) and maximum at L4-L5-S1 i.e. 18(36%). Only 5(10%) patients were presented with multiple disc involvement.

In Sudhir Singh *et al*. [26] study, intervertebral disc prolapse was seen at L1-L2 level in 2 cases, at L3-L4 in 8 cases, at L4-L5 in 20 (50%) cases and at L5-S1 in 10 (25%) cases among total of 40 patients in SNRB group. While in Arun Kumar *et al*. [29] study 32 (80%) had L4-L5 intervertebral disc prolapse in whom L5 nerve root was targeted and 8 (20%) had L5-S1 disc prolapse in whom S1 nerve was targeted. Mistry *et al*. [12] reported maximum number of patients were having disc herniation at level of L4-L5 (43%) and L5-S1 (47%) and majority of patients having disc prolapse was paracentral (72%). But Joohyun Kim *et al*. [28] selected single level L4-L5 in inclusion criteria to reduce the variables among multiple factors.

The improvement of mean VAS was observed immediate post SNRB with respect to initial pre-procedure assessment of pain and activity. The mean VAS scores were significantly less after block (4.7 ± 1.32) as compared to pre procedure (7.02 ± 1.31) ($p<0.001$) with 33.04% improvement.

Weiner and Fraser [15] in a prospective study investigated the success of nerve root blocks in thirty patients with foraminal and extraforaminal disc herniation. They found an immediate pain relief in 27 patients. However in Arun Kumar *et al*. [29] study, mean numeric rating of pain using NRS [32], immediately after the procedure, was reduced to 4 from pre-procedure mean NRS 8, but NRS assessment was done on 2nd day after the procedure for 7 patients who returned with similar pain. It was found to be the same as pre procedural status or one point less.

On following up SNRB patients up to 3 months where mean VAS score at first follow up (1 week) was 3.84 ± 1.25 with improvement of 45.3% from initial score of 7.02 ± 1.31 and 2.82 ± 1.71 at second follow up (4 weeks) with improvement of 59.8%. Final outcome at 3 months, mean VAS score was 2.32 ± 1.64 with improvement of 66.9% compared to initial pain score. The reduction in pain score was statistically significant ($p<0.05$) with respect to initial values.

In Sudhir Singh *et al*. [26] study final follow up was after 1year where the initial pain score (VAS) was 7.65 ± 0.5 in SNRB group, which reduced to 4.07 ± 0.9 at 1 year follow up with final 46.8% pain improvement. The reduction of pain score was 57.5% at 1 month, 55.5% at 3 months and 52.9% at 6 months. Even though pain had increased at 1year follow-up from previous follow-ups, the reduction in pain score was statistically significant at all follow-ups.

Joohyun Kim *et al*. [28], in nerve block group found mean VAS leg 2.18 ± 0.83 (49.3% improvement) at 1month, 1.71 ± 1.00 (60.2%) at 6months and 1.24 ± 0.74 (71.2% improvement) at 1 year against initial mean VAS leg of 4.3 ± 1.0. However initial mean VAS back was 2.6 ± 1.4 which came down to 1.29 ± 1.12 with 56.9% improvement at 1 month, 0.88 ± 0.81 (66.15% improvement) at 6 months and 0.71 ± 0.72 with 72.7% improvement at 1year follow up.

Also, Salunkhe *et al*. [33] analyzed their results on VAS, where at the end of 3 months, 41 (82%) of patients enjoyed excellent (decrease in pain scale ≥ 5) results, 4 (8%) had good (decrease in 3-4 points) results, fair (1-3 points decrease in pain scale) results were seen in 2 (4%), and poor (no improvement) results were seen in 3 (6%). Similarly, in Weiner and Fraser [15] study 22 of 28 patients (79%) had a substantial and permanent pain reduction during 1-10 years follow-up. With such comparison, we had 28 (56%) patients with excellent, 17 (34%) good, 4 (8%) fair and 1 (2%) poor results in our study.

We have assessed disability among patients, according to ODI score. On initial assessment the mean ODI score was 49.88 ± 17.18 which at 1 week with mean 31.08 ± 9.7 improved by 37.7% and 22.52 ± 9.31 (54.8%), 16.56 ± 10.3 (66.8%) at second (4 weeks) and final (3 months) follow up respectively where scores of non-improved patients also included. The improvement was statistically significant at all follow ups as compared to initial values but mean values were not significant between second and final follow up except for ODI scores, represents a plateau in the further improvement after second follow up.

Sudhir Singh *et al*. [26] found initial ODI in SNRB group as 78.20 ± 2.8 which reduced to 41.70 ± 5.5 at 1 year period. The calculated improvement of 52.8% at 1 month, 49.42% at 3 months, 48.6% at 6 months and 46.7% at 1 year period.

Mistry *et al*. [12] studied SNRB effectiveness, where blocks were given every 20 days for 6 weeks and followed up for minimum 6 months. Patients treated with root block, total 18.3% patients presented with excellent result, 50% patients with good result, 28% with fair results and only 3 patients were with poor results according to ODI score.

In the present study, 13 (26%) patients had complications just after the procedure where the most common complication noted was pain at injection site in 11 incidences, followed by increased radicular pain and nausea with 2 incidences in each. One patient was in common with these three complications. All these complications were managed symptomatically where they get recovered completely over a short period of time. No other complication was observed including infection, hematoma or central or spinal cord infarctions.

Huston CW *et al*. [34] found no major complications except for minor side effects as increased pain at the injection site (17.1%); increased radicular pain (8.8%); lightheadedness (6.5%); increased spine pain (5.1%); nausea (3.7%);

nonspecific headache (1.4%); and vomiting (0.5%). However, serious and lethal side effects have been reported in literature due to infection, hematoma or central and spinal cord infarctions.

Table 1: Age distribution of patient

Age Group	No. of patients	(%)
20-30	9	18
31-40	19	38
41-50	17	34
51-60	5	10
Total	50	100

Table 2: Distribution of patients with duration of symptoms and intervention

Duration (months)	No. of patients	(%)
<6 months	20	40
7 to 12	21	42
13-18	6	12
19-24	2	4
>24 months	1	2
Total	50	100

Table 3: Intervertebral disc involvement

MRI finding	No. of patients	(%)
L4-L5	17	34
L5-S1	10	20
L4-L5-S1	18	36
Multiple discs	5	10
Total	50	100

Table 4: Pain and activity improvement at immediate post procedure

Scale	Pre Procedure		Immediate		p value
	Mean	SD	Mean	SD	
VAS score	7.02	1.31	4.7	1.32	<0.001

Table 5: Improvement in pain and disability at follow ups

Scale	Pre Procedure		1st Follow up (1 week)		2nd Follow up (4 weeks)		Final Follow up (3 months)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
VAS score	7.02	1.31	3.84	1.25	2.82	1.17	2.32	1.64
ODI score	49.88	17.18	31.08	9.7	22.52	9.31	16.56	10.3

Table 6: Improvement in VAS score in study population distribution

VAS score		0	1	2	3	4	5	6	7	8	9	10	Total
Pre- procedure	n	0	0	0	0	1	7	9	12	15	6	0	50
	%	0	0	0	0	2	14	18	24	30	12	0	100%
Immediate	n	0	0	2	8	12	14	9	5	0	0	0	50
	%	0	0	4	16	24	28	18	10	0	0	0	100%
1st f/u	n	0	0	10	9	14	13	4	0	0	0	0	50
	%	0	0	20	18	28	26	8	0	0	0	0	100%
2nd f/u	n	3	2	14	14	16	1	0	0	0	0	0	50
	%	6	4	28	28	32	2	0	0	0	0	0	100%
final f/u	n	8	6	15	13	3	2	2	1	0	0	0	50
	%	16	12	30	26	6	4	4	2	0	0	0	100%

Table 7: Improvement in ODI score in study population with follow up

Disability (ODI)	Pre-procedure		1st f/u		2nd f/u		final f/u	
	n	%	n	%	n	%	n	%
Minimal	3	6%	8	16%	25	50%	39	78%
Moderate	13	26%	36	72%	24	48%	10	20%
Severe	23	46%	6	12%	1	2%	1	2%
Crippled	8	16%	0	0%	0	0%	0	0%
Bed bound	3	6%	0	0%	0	0%	0	0%
Total	50	100%	50	100%	50	100%	50	100%

Table 8: Complications

Complications	No. of patients	(%)
Pain at injection site	11	22%
Increased radicular pain	2	4%
Headache	0	0%
Nausea	2	4%
Vomiting	0	0%
Dreadful complications	0	0%

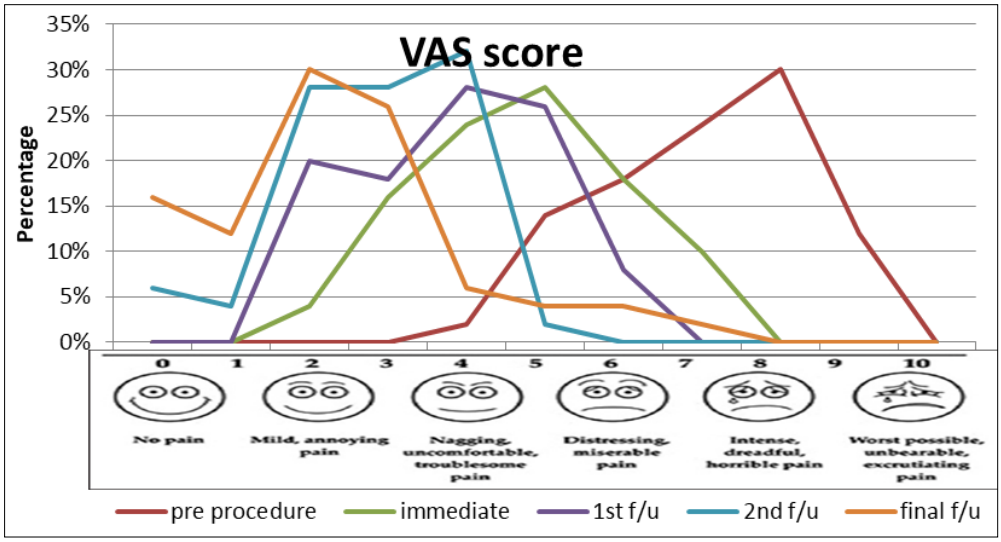


Fig 1: Improvement in VAS score in study population distribution

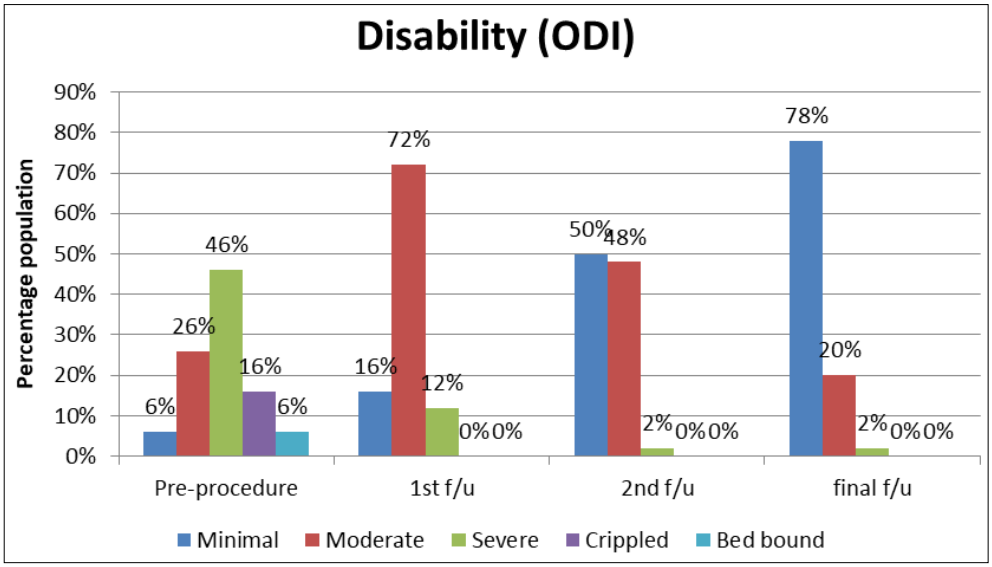


Fig 2: Improvement in ODI score in study population with follow up

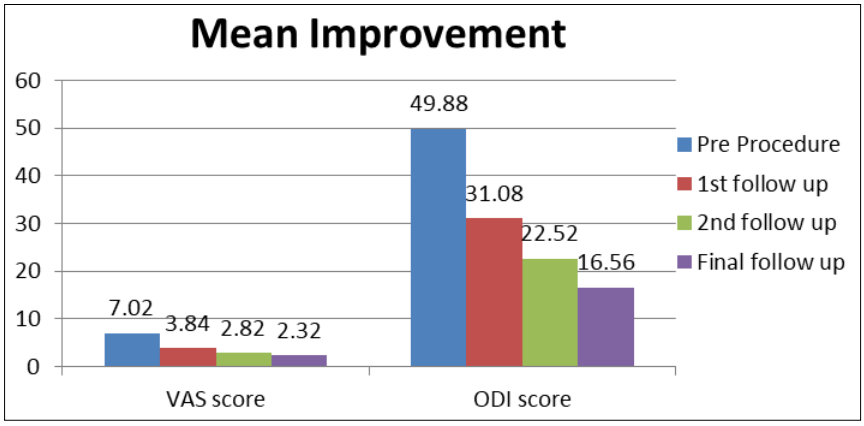


Fig 3: Improvement in pain and disability at follow ups

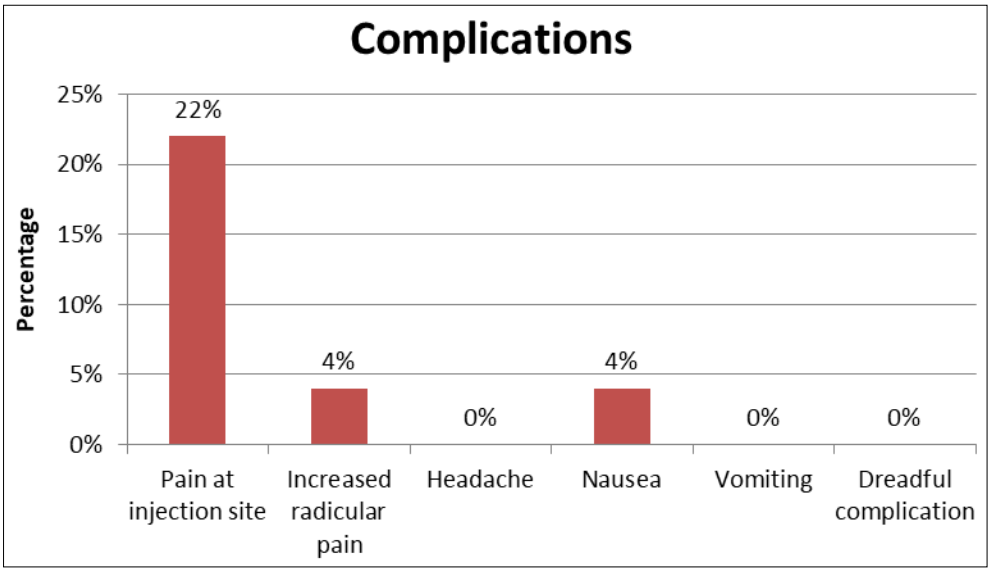


Fig 4: Complications

5. Conclusion

As a direct result of our study, we can recommend nerve root block as a step prior to operative intervention in patients with lumbar radiculopathy due to intervertebral disc prolapse or spinal stenosis. We also believe that it is an effective measure in relieving symptoms for long enough that patients are able to avoid surgery in the meantime. However, patients may get instantaneous relief to no relief i.e. uncertain recovery and generally the root cause remains untreated after SNRB. These are the main drawbacks of SNRB like non operative treatments as compared to surgical interventions. SNRB can be considered as important, effective, less expensive, non-operative and less invasive treatment modality to provide lasting therapeutic benefit, allowing the patient to participate in life style modifications, physiotherapies and early resumption of routine activities, saving working manpower hours.

6. Financial support and sponsorship: Nil.

7. Conflicts of interest: There are no conflicts of interest

8. References

1. Bindra S, Sinha AG, Benjamin AI. Epidemiology of low back pain in Indian population: A review. International journal of basic and applied medical sciences. 2015; 5(1):166-79.
2. Jain N, Jain A. The Management of Intractable Low Back Pain: Recent Advances. Journal of international medical sciences academy. 2013; 26(4):245-47.
3. Manchikanti L. Epidemiology of low back pain. Pain physician. 2000; 3(2):167-92.
4. Deyo RA, Cherkin D, Conrad D, Volinn E. Cost, controversy, crisis: low back pain and the health of the public. Annual review of public health. 1991; 12(1):141-56.
5. Volinn E. The Epidemiology of Low Back Pain in the Rest of the World: A Review of Surveys in Low-and Middle-Income Countries. Spine. 1997; 22(15):1747-54.
6. Hoy D, Toole MJ, Morgan D, Morgan C. Low back pain in rural Tibet. The Lancet. 2003; 361(9353):225-6.
7. Çakmak A, Yücel B, Özyalçn SN, Bayraktar B, Ural HI, Duruöz MT *et al*. The frequency and associated factors of low back pain among a younger population in Turkey. Spine. 2004; 29(14):1567-72.
8. Gilgil E, Kaçar C, Bütün B, Tuncer T, Urhan S, Yildirim Ç *et al*. Prevalence of low back pain in a developing urban setting. Spine. 2005; 30(9):1093-8.
9. Barrero LH, Hsu YH, Terwedow H, Perry MJ, Dennerlein JT, Brain JD *et al*. Prevalence and physical determinants of low back pain in a rural Chinese population. Spine. 2006; 31(23):2728-34.
10. Dunn KM, Croft PR. Epidemiology and natural history of low back pain. European Journal of Physical and Rehabilitation Medicine. 2004; 40(1):9.
11. Hui CW, Chan PH, Cheung KK. Selective nerve root block for sciatica. Hong Kong J Orthop Surg. 2005; 9(1):22-7.
12. Mistry MD, Shah DA, Chaudhari VR, Thakkar LH. Effectiveness of root block and radiofrequency in prolapse intervertebral disc and lumbar canal stenosis. Indian Journal of Scientific Research. 2013; 4(2):205.
13. Weber H. Lumbar disc herniation. A controlled, prospective study with ten years of observation. Spine. 1983; 8(2):131-40.
14. Macnab IA. Negative Disc Exploration: An analysis of the causes of nerve-root involvement in sixty-eight patients. JBJS. 1971; 53(5):891-903.
15. Weiner BK, Fraser RD. Foraminal injection for lateral lumbar disc herniation. J Bone Joint Surg Br. 1997; 79(5):804-7.
16. Lutz GE, Vad VB, Wisneski RJ. Fluoroscopic transforaminal lumbar epidural steroids: an outcome study. Archives of Physical Medicine and Rehabilitation. 1998; 79(11):1362-6.
17. Narozny M, Zanetti M, Boos N. Therapeutic efficacy of selective nerve root blocks in the treatment of lumbar radicular leg pain. Swiss medical weekly. 2001; 131(5/6):75-80.
18. Cuckler JM, Bernini P, Wiesel SW, Booth JR, Rothman RH, Pickens GT. The use of epidural steroids in the treatment of lumbar radicular pain. A prospective, randomized, double-blind study. The Journal of bone and joint surgery. American volume. 1985; 67(1):63-6.
19. NG L, Chaudhary N, Sell P. The efficacy of corticosteroids in periradicular infiltration for chronic radicular pain: a randomized, double-blind, controlled trial. Spine. 2005; 30(8):857-62.

20. Riew KD, Park JB, Cho YS, Gilula L, Patel A, Lenke LG *et al*. Nerve root blocks in the treatment of lumbar radicular pain: a minimum five-year follow-up. JBJS. 2006; 88(8):1722-5.
21. Manchikanti L, Buenaventura RM, Manchikanti KN, Ruan X, Gupta S, Smith HS *et al*. Effectiveness of therapeutic lumbar transforaminal epidural steroid injections in managing lumbar spinal pain. Pain Physician. 2012; 15(3):E199-245.
22. Riew KD, Yin Y, Gilula L, Bridwell KH, Lenke LG, Lauryssen C *et al*. The effect of nerve-root injections on the need for operative treatment of lumbar radicular pain: a prospective, randomized, controlled, double-blind study. JBJS. 2000; 82(11):1589.
23. DePalma MJ, Bhargava A, Slipman CW. A critical appraisal of the evidence for selective nerve root injection in the treatment of lumbosacral radiculopathy. Archives of physical medicine and rehabilitation. 2005; 86(7):1477-83.
24. Price DD, McGrath PA, Rafii A, Buckingham B. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. Pain. 1983; 17(1):45-56.
25. Roland M, Fairbank J. The Roland–Morris disability questionnaire and the Oswestry disability questionnaire. Spine. 2000; 25(24):3115-24.
26. Singh S, Kumar S, Chahal G, Verma R. Selective nerve root blocks vs. caudal epidural injection for single level prolapsed lumbar intervertebral disc–A prospective randomized study. Journal of Clinical Orthopaedics & Trauma. 2017; 8(2):142-7.
27. Thackeray A, Fritz JM, Brennan GP, Zaman FM, Willick SE. A pilot study examining the effectiveness of physical therapy as an adjunct to selective nerve root block in the treatment of lumbar radicular pain from disk herniation: a randomized controlled trial. Physical therapy. 2010; 90(12):1717-29.
28. Kim J, Hur JW, Lee JB, Park JY. Surgery versus nerve blocks for lumbar disc herniation: quantitative analysis of radiological factors as a predictor for successful outcomes. Journal of Korean Neurosurgical Society. 2016; 59(5):478.
29. Arun-Kumar K, Jayaprasad S, Senthil K, Lohith H, Jayaprakash KV. The outcomes of selective nerve root block for disc induced lumbar radiculopathy. Malaysian Orthopaedic Journal. 2015; 9(3):17.
30. Wheeler AH, Berman SA. Low back pain and sciatica. Available from: URL: http://emedicine.medscape.com/article/1144130-overview Access Date: 22.02.2018
31. Frymoyer JW. Back pain and sciatica. N Engl J Med. 1988; 318:291-300.
32. Jensen MP, McFarland CA. Increasing the reliability and validity of pain intensity measurement in chronic pain patients. Pain. 1993; 55(2):195-203.
33. Salunkhe RM, Pisal T, Hira YS, Singh A, Patel JJ, Goud SS. Study of nerve root block procedure as a diagnostic and therapeutic aid in lumbosacral radiculopathy. Indian Journal of Pain. 2016; 30(2):127.
34. Huston CW, Slipman CW, Garvin C. Complications and side effects of cervical and lumbosacral selective nerve root injections. Archives of physical medicine and rehabilitation. 2005; 86(2):277-83.