International Journal of Orthopaedics Sciences

E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2021; 7(1): 678-680

www.orthopaper.com
Received: 16-10-2020
Accepted: 18-12-2020

Dr. Ashish Naik
MS Orthopaedics, Department of Orthopaedics, MGM Hospital Kamothe, Navi, Mumbai, Maharashtra, India

Dr. Sanjeev Singh
Department of Orthopaedics, MGM Hospital Kamothe, Navi, Mumbai, Maharashtra, India

Dr. Harsh Kotecha
2nd Year Junior Resident, Department of Orthopaedics, MGM Hospital Kamothe, Navi, Mumbai, Maharashtra, India

Dr. Mohit Issrani
Department of Orthopaedics, MGM Hospital Kamothe, Navi, Mumbai, Maharashtra, India

Corresponding Author:
Dr. Harsh Kotecha
2nd Year Junior Resident, Department of Orthopaedics, MGM Hospital Kamothe, Navi, Mumbai, Maharashtra, India

Clinical parameters predicting successful outcomes following transforaminal epidural selective nerve root blocks for acute lumbar disc herniation

Dr. Ashish Naik, Dr. Sanjeev Singh, Dr. Harsh Kotecha and Dr. Mohit Issrani

DOI: https://doi.org/10.22271/ortho.2021.v7.i1k.2558

Abstract
Background: The lifetime prevalence of radiculopathy due to a herniated lumbar disc is estimated to be around 4% in females and 5% in males. The efficacy of SNRB in acute LDH has been quoted variedly in previous studies ranging from 30% to 80% [6]. There are only a few studies which identify the various clinical parameters that can predict successful outcomes in patients undergoing SNRB.
Methods: The prospective study was conducted at Mahatma Gandhi Missions Hospital Navi Mumbai, between March 2019 and February 2020.During the study period, total 60 patients with documented LDH on magnetic resonance imaging (MRI), presenting with unilateral radiculopathy, with symptom duration of less than 3 months who had failed adequate conservative management of about 3 weeks duration were treated with transforaminal.
Result: Out of the 60 patients which were included in the study, 50 patients had adequate pain relief for the study period of one year while 10 patients did not have sufficient relief of pain. Thus Transforaminal SNRB had an efficacy of 83.33% in our study. In our study out of the 60 patients 32 had right side involvement and 28 had left side involvement. Out of those having right side involvement 26 had successful and 6 had unsuccessful outcome while 28 had left side involvement in which 25 had successful outcome and 3 had unsuccessful outcome and the p value was insignificant for this clinical parameter.
Conclusion: Transforaminal Selective Nerve Root Block had an efficacy of 83.33% in our study. It is an efficient technique which provides adequate pain relief for about one year.

Keywords: clinical parameters, transforaminal epidural, nerve root

Introduction
Intervertebral disc disease and disc herniations are most prominent in the third and fourth decades of life. The usual history of lumbar disc herniation is of repetitive lower back pain and buttock pain relieved by a short period of rest. The pain is suddenly exacerbated, often by a flexion episode with the appearance of leg pain which is often more than or equal to the back pain. This radicular pain from nerve root compression is due to herniated nucleus pulposus [1].
The lifetime prevalence of radiculopathy due to a herniated lumbar disc is estimated to be around 4% in females and 5% in males [2]. Compressive radiculopathy due to acute lumbar disc herniation (LDH) manifests with radiating pain along the compressed nerve root, sensory dysfunction, motor deficits, and rarely, cauda equina syndrome. In most cases, this radiculopathy has an expectant good outcome with a conservative line of care. However, in some patients with recalcitrant pain, prolonged conservative care can result in poor functional outcomes [3]. The acute radicular pain in patients with LDH is related partly to the mechanical compression by the herniated disc and to a larger extent, due to the perineural inflammatory response around the nerve root. Local instillation of corticosteroids around the inflamed nerve root has an important role in alleviating the pain [4].
Early surgery in carefully selected patients with discogenic radiculopathy can achieve rapid relief, potential disadvantages of surgery include risks of infection, discitis, recurrence, nerve root injury, and anaesthetic complications [5]. Transforaminal Selective Nerve Root Block (SNRB) can effectively avoid these complications associated with surgery. The principle of

using this technique is for reduction of inflammation of the nerve root by injecting a steroid. Transforaminal epidural injections for symptomatic lumbar disc herniation resulted in better short-term relief and fewer long-term complications in comparison to interlaminar epidural injections [1].

The efficacy of SNRB in acute LDH has been quoted variedly in previous studies ranging from 30% to 80% [6]. There are only a few studies which identify the various clinical parameters that can predict successful outcomes in patients undergoing SNRB. We performed a prospective, observational study of patients with acute Lumbar Disc Herniations (LDH) treated with Transforaminal SNRB and evaluated them over a period of one year to evaluate the clinical parameters predicting successful outcomes.

Materials and Methods

The study was conducted at Mahatma Gandhi Missions Hospital Navi Mumbai, between March 2019 and February 2020 after obtaining clearance from the Institutional Ethics Committee (IEC). Informed consent was taken from each patient prior to inclusion in the study and patient confidentiality was maintained. During the study period, all patients with documented LDH on magnetic resonance imaging (MRI), presenting with unilateral radiculopathy, with symptom duration of less than 3 months who had failed adequate conservative management of about 3 weeks duration were treated with transforaminal SNRB. Patients with cauda equina syndrome, neurological deficit, chronic radiculopathy, bilateral radiculopathy, recurrent disc prolapse, spondylolisthesis and radiculopathy associated with red flags such as due to trauma, infections, or tumours were excluded from the study. Thus 60 patients were included in the study and were treated by Transforaminal SNRB for acute lumbar disc herniations.

Technique of selective nerve root block

Patient is positioned prone on the OT table and the part preparation and draping was done under aseptic precautions. The pathological level to be injected was identified under the C-arm guidance using AP and lateral views of lumbar spine. The area which was to be injected was infiltrated with 5ml of 2% lignocaine. A 22 gauge spinal needle was advanced within the anesthetized soft tissue tract and directed towards 6'O clock position of the ipsilateral pedicle in anteroposterior view and towards the neural foramina, below the pedicle in lateral view under C-arm guidance. After confirmation of the pathological level under C-arm guidance 3 ml of 0.5% bupivacaine mixed with 80 mg of triamcinolone was injected around the nerve root. A sterile dressing was applied and the patient was discharged after an observation period of 30 minutes Patients were followed up at 3 weeks, 6 weeks, 6 months, and 1 year using ODI (Oswestry Disability Index) and VAS (Visual Analogue Score) scores.

Clinical parameters

All the patients included in the study the following clinical parameters were noted and documented respectively age, sex, duration of symptoms, side of pain, level of pathology, BMI, axial back pain, visual analogue scale (VAS) score (preoperative, 3 weeks, 6 weeks, 6 months and 1 year), and Oswestry Disability Index (ODI) score (preoperative, 3 weeks, 6 weeks, 6 months and 1 year.), as well as smoking.

Statistical analysis

Statistical analysis was done using chi square test and a p value <.05 was considered to be statistically significant. A logistic regression analysis was performed to study the effect of multiple factors.

Results

Out of the 60 patients which were included in the study, 50 patients had adequate pain relief for the study period of one year while 10 patients did not have sufficient relief of pain. Thus Transforaminal SNRB had an efficacy of 83.33% in our study.

The analysis of the various clinical parameters in our study showed that those having higher mean VAS and ODI scores both pre-operatively and at 3 weeks post injection and axial back pain were predictive of an unsuccessful outcome. Rest all the other clinical parameters were not predictive of the outcome.

In our study out of the 60 patients 32 had right side involvement and 28 had left side involvement. Out of those having right side involvement 26 had successful and 6 had unsuccessful outcome while 28 had left side involvement in which 25 had successful outcome and 3 had unsuccessful outcome and the p value was insignificant for this clinical parameter.

Duration of symptoms and smoking also had p value of 0.20 and 0.08 respectively and were not significant.

Table 1: Frequency of successful and unsuccessful outcome different lumbar level following SNRB

Level of involvement (No. of patients)	Group A (Successful outcome)	Group B (Unsuccessful outcome)	*P* value
L4-L5 (32)	26	6	
L5-S1 (27)	23	4	
L3-L4 (1)	1	0	0.74

Table 2: Frequency of successful and unsuccessful outcome among various clinical parameters

Clinical parameters	Group A (Successful outcome)	Group B (Unsuccessful outcome)	*P* value
Total patients (60)	50	10	
Male/Female	28/22	6/4	0.40
Age	40.29±14.82	37.3±15.24	0.39
BMI	26.53±3.24	26.52±3.84	0.33
Axial back pain	10	8	0.03
Pre-operative VAS	6.96±1.013	8.182±1.24	0.04
Pre-operative ODI	17.47±6.89	22.2±9.32	0.02
3 weeks ODI	12.82±5.07	17.2±5.8	0.003

Discussion

Transforaminal SNRB is a standard initial care of intervention in patients not responding to other conservative measures following Lumbar Disc Herniations. The therapeutic effect of local steroid infiltration is well recognized in the literature through several clinical studies and the success of pain relief is quoted up to 88%. There are few studies which have evaluated the various clinical parameters which predict the outcome of Transforaminal SNRB injections in patients with lumbar disc herniations.

In our study patients who were having higher mean VAS and ODI scores both pre-operatively and at 3 weeks post injection and axial back pain were predictive of an unsuccessful outcome. While the other clinical parameters like age, sex, duration of symptoms, side of pain, level of pathology, BMI and smoking were not predictive of the outcome of Transforaminal SNRB injections in patients with lumbar disc herniations. In our study patients who were having higher

mean VAS and ODI scores both pre-operatively and at 3 weeks post injection and axial back pain did not have an adequate relief of pain following Transforaminal SNRB.
The only limitation of study being a relatively small study population.

Conclusion

Transforaminal Selective Nerve Root Block had an efficacy of 83.33% in our study. It is an efficient technique which provides adequate pain relief for about one year. Patients who had higher mean VAS and ODI scores both pre-operatively and at 3 weeks post injection and axial back pain can be counselled of a less favourable outcome and the need for operative intervention.

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