



“EFFICACY OF NERVE ROOT BLOCK FOR THE TREATMENT OF LUMBAR SPINAL CANAL STENOSIS IN ADULTS OLDER THAN 60 YEARS OF AGE”

Orthopaedics

Dr Byshetty Raju	Assistant Professor, Maheshwara Medical College & Hospital, Chitkul, Pantancheru, Hyderabad, Telangana State
Dr Madarapu Balaji	Assistant Professor, Maheshwara Medical College & Hospital, Chitkul, Pantancheru, Hyderabad, Telangana State
Dr Kadiri Venkata Ranganath*	Associate Professor, Maheshwara Medical College & Hospital, Chitkul, Pantancheru, Hyderabad, Telangana State. *Corresponding Author

ABSTRACT

Background:- Patients suffering from Lumbar spinal canal stenosis usually complain severe low back pain with Radiculopathy that warrants immediate treatment. Decompression of the Lumbar spine for stenosis is a classical procedure that amiably responds by relieving the patient from the neurogenic claudication and radiculopathy. Patients suffering from lumbar spinal canal stenosis usually prefer conservative management due to diminished function and other associated comorbidities. Selective nerve root block or Transforaminal epidural injection for lumbar spinal canal stenosis is a well-known conservative treatment since a long time but only a handful of the cases confirm its effectiveness in the elderly patients. Our investigation was carried out to find the efficacy of Selective nerve root block for lumbar spinal canal stenosis in elderly patients above age of 60 years. **Methodology:-** The research is prospective study been conducted from August 2020 to July 2022 at the Orthopaedics Unit, Maheshwara Medical College & Hospital, Chitkul, Patancheru, Telangana state. A total of 60 patients of both genders aged over 60 years with medication-resistant lumbar spinal canal stenosis without cauda equina syndrome were included in the study. Patients with acute lumbar disc herniation were excluded. We investigated the effectiveness of selective nerve root block, number of procedures, MRI findings and duration of disease. Depending on duration & severity of disease, we performed 1 to 7 selective nerve root blocks by same spine surgeon. Patients who responded well are termed as effective group and Patients whose symptoms were not relieved by selective nerve root block and went for surgery were named as ineffective group. **Results:-** Out of total 60 patients, there were 22 (36.6%) male and 38 (63.3%) Female patients in the study group with a male to female ratio of 1:1.7. 35 patients were satisfied with selective nerve root block documented by reduction in pain in Visual Analogue Scale. In our study the effectiveness of selective nerve root block was 58%. The cross-sectional area of lumbar canal stenosis in the effective group was 108.63 mm² whereas ineffective group had 77 mm². This shows statistically significant narrower area of lumbar canal in ineffective group with P value of 0.001. Our patients didn't have severe neuralgia after selective nerve root block. **Discussion:-** Our study outcome revealed that more than 58% of elderly patients with lumbar spinal canal stenosis showed symptomatic relief with selective nerve root block. Selective nerve root block can be performed in a safer way in the elderly and is likely to be a preferable treatment option for older patients with various risks like poor general condition. **Conclusions:-** Transforaminal epidural injection or Selective nerve root block can be tried in multiple settings which provides symptomatic improvement in elderly patients above 60 years of age and may be an option for conservative treatment.

KEYWORDS

elderly patients, lumbar spinal canal stenosis, Selective nerve root block, Transforaminal epidural injection.

INTRODUCTION:-

Lumbar spinal canal stenosis is a decrease in dimensions of central or lateral spinal canal that occurs as result of chronic degenerative changes at lumbar canal segment. Normal cross-sectional area of lumbar canal is 150-200 mm². Decrease in cross-sectional area lesser than 100mm² is a certain indicator of combined central and lateral lumbar canal stenosis.

Central canal stenosis is commonly due to a combination of disc bulging anteriorly combined with ligamentum flavum hypertrophy and superior articular process hypertrophy that leads to compression of several nerves in the dura. The lateral portion of the lumbar canal is divided into three zones: The lateral recess, foraminal zone, extraforaminal zone.

The pathology that is commonly seen in lateral recess is bony overgrowth of the superior articular process due to the degenerative facet joint arthrosis. The space is decreased by bulging disk compressing the traversing nerve root.

Patients suffering from lumbar spinal canal stenosis of the radiculopathy and mixed types usually have symptoms like radicular pain, numbness, and intermittent claudication that diminish patients' quality of life and limit their everyday activities(1). In recent times, the number of spinal surgeries have increased and particularly for the elderly patients who are over 60 years of age. Immediate surgical intervention when associated with acute lower limb paralysis or rectal or bladder disorders is much warranted, in their absence the efficacy of the surgical treatment remains debatable. Also, physiological function declines as the patient ages and the comorbidities Such as cardiovascular disease and renal dysfunction are also increased. With this the perioperative complications in patients with comorbidities and also the increasing age the risk increases. So even patients who are having advanced Lumbar spinal canal stenosis usually prefer or are

required to opt for the conservative therapy which includes rest, physical therapy, usage of muscle relaxants and non-steroidal anti-inflammatory drugs. Selective nerve root block is an alternative for patients where the symptoms persist or when patients are deemed to be unfit for surgery. The Selective nerve root block therapeutic role in lumbar spinal stenosis is established (1,3).

Selective nerve root block or Transforaminal epidural injection can be performed at cervical and lumbar spine and can reduce pain in patients suffering from severe backache. Few incidents of adverse events were seen in occurring with Transforaminal epidural injection. There are incidence of higher complication rates who have taken multiple several injections compared to those who had taken only one injection of Transforaminal epidural injection [4], and we haven't seen any patients of more effectiveness of repeated Transforaminal epidural injection. Many incidence of avoidance of surgery by Selective nerve root block in the elderly patients.

Our investigation was carried out to find the efficacy of Transforaminal epidural injection or Selective nerve root block for lumbar spinal canal stenosis in elderly patients above age of 60 years.

MATERIALS AND METHODS:-

A total of 60 patients who visited our hospital between 2020 and 2022 with Lumbar spinal canal stenosis and who underwent Selective nerve root block or Transforaminal epidural injection Were included. Diagnosis of Lumbar spinal canal stenosis was made on based on clinical features and MRI findings.

Patients with acute-onset lumbar disc herniation, trauma, cauda equina syndrome, polymyalgia rheumatica, peripheral vascular circulatory disorders, and psychological factors, and patients who could not be followed up owing to non-attendance or transfer of doctor after Transforaminal epidural injection were excluded.

Out of total 60 patients, there were 22 (36.6%) male and 38 (63.3%) Female patients in the study group with a male to female ratio of 1:1.7.

We confirmed retrospectively the presence or absence of surgery, number of blocks that were performed, block effect, magnetic resonance images, presence or absence of complications, and disease duration by clinical records. The magnetic resonance images were examined for the presence or absence of herniation in the area of the spinal canal at the responsible level. The average of three measurements at the same level were used to calculate the area of the spinal canal. The patients with visual analog scale (VAS) records in whom the scores decreased over time were defined as those with pain reduction; for those without VAS records, pain reduction was assessed based on patient statements and their activities of daily living (ADL) improvements noted in the patient's medical record at the time of their next visit. In the non-operative patients where pain relief was achieved with SNRB were defined as the effective group. This group excluded those patients who did not wish to undergo surgery owing to varied factors such as advanced age, ineligibility for surgery due to comorbidities, an overall poor general condition and also those who declined surgery for personal reasons. Among the patients who underwent surgery, the ineffective group consisted those who underwent surgery because of the inadequate efficacy of SNRB, from which those who strongly desired surgery to improve their ADL even though SNRB had some efficacy and those with strong desire for surgery at their visit were excluded. The results of each investigated item between the effective group and the ineffective group were compared.

Technique

Single spine surgeon performed Selective nerve root block or Transforaminal epidural injection where patient was placed in prone position on fracture table with help of fluoroscopy and was injected with 1% mepivacaine after confirming that the needle tip was in the position. Depending on the patient's symptoms procedure was performed one to seven times in all patients at one- to four-week intervals.



Figure-A : Fluoroscopic image at Selective nerve root block

Statistical analysis

Data for both groups were confirmed to be normally distributed, and results were compared using t-tests for each category. Analyses were performed using Excel (Microsoft, Redmond, WA, USA). $P < 0.05$ was considered statistically significant.

RESULTS:-

Of the 35 patients who underwent SNRB, 60 met the inclusion criteria 25 patients were operative. Of the non-operative cases, 35 patients comprised the effective group, and of the surgically treated cases, 25 patients comprised the ineffective group (Figure B).

Among the 112 subjects of which 69 subjects belonged to the effective group and 61% of them avoided surgery, with Selective nerve root block or Transforaminal epidural injection. The average age was 85.0 years in the effective group and 83.2 years in the ineffective group.

On Comparison of each category, the spinal canal area at the causative level was 108.63 mm² in the effective group and 77.06 mm² in the ineffective group and the ineffective group had a significantly narrower spinal canal area than the effective group ($p=0.0094$). The disease duration, blocks number and rate of lumbar disc herniation were 8.43 months/18.95 months ($p=0.112$), 3.03 times/3.19 times ($p=0.697$) and 38.2%/47.6% ($p=0.449$), in the effective/ineffective groups, respectively, with no significant difference.

Despite a patient's symptom relapse from the effective group six months after the initial symptom relief, the SNRB again relieved the symptoms. Following which, no symptom recurrence was observed.

From the ineffective group, three patients relapsed 2-6 months after symptom relief with SNRB and then required surgical treatment. The patients who required surgical treatment owing to relapse of symptoms after Selective nerve root block or Transforaminal epidural injection were not included in the effective group. The patients did not complain about any complications like residual neuralgia, hematoma, or infection following SNRB.



Figure : B- Patient flow chart. SNRB: selective nerve root block,

DISCUSSION:-

In this study, the efficacy of Selective nerve root block or Transforaminal epidural injection for the treatment of LCS in patients above 80 years of age was investigated. Among conservative treatment options the efficacy of SNRB has often been reported.^[5] Kannan et al. investigated the efficacy of SNRB in patients with radiculopathy who persisted to have a VAS score following medication^[1] 76 patients who underwent SNRB of which 35 patients subsequently required surgery; 54% of the patients were able to avoid surgery, with SNRB. In this study, 61% of the patients were able to avoid surgery, which provides effects similar to those of SNRB. The prognostic factors for conservative treatment of LCS which include lumbar kyphosis, range of motion, spinal canal area, and severe intermittent claudication were previously reported^[6-8]. In this study, it was concluded that the spinal canal area at the responsible level was significantly narrower in the ineffective group. Kannan et al. investigated the outcome of the elderly patients who were undergoing conservative treatment and the factors that were affecting it^[9]. It was reported by the authors that the rate of improvement in ADL with conservative treatment was lower in the patients with complete contrast blockage at the level responsible on myelography. From the present study, we inferred that the effect of conservative therapy is poor in cases with a significantly narrowed spinal canal area with therapeutic limitations in these cases.

In the current study, the duration of disease was negligible between the effective and ineffective groups; but, the p-value was low, at 0.112, and the duration of disease was 8.43 months and 18.95 months, respectively. Despite the negligible difference, there was a variance in disease duration that was large, implying that the longer the disease duration, the less fruitful the non-operative therapy could be. As the number of cases increase, it's likely for it to be a significant difference in the duration of disease.

Mallinson et al. reported that 69.1% of patients experienced pain relief within seven days after SNRB^[3]. On the contrary, Ko et al. investigated VAS scores over time after SNRB and reported that the pain reduction rate was highest at two weeks and after which the rate gradually decreased^[10]. In this study, the average number of times that SNRB was performed was three, and the efficacy rate was 61%. Two weeks following a single nerve root block, there was a reported decrease in the pain reduction rate and it also put forward the possibility that repeated SNRBs might contribute to a greater symptom relief. However, there have been no reports on the effects of multiple nerve root blocks, and this study did not reveal data to support the optimal frequency.

There are known reports of adverse events after SNRB which included minor complications like focal hemorrhage and nerve root irritation symptoms in 3162 of 15,645 patients. Stalcup et al. reported minor complications in 98 of 1777 patients who underwent SNRB^[4]. The symptoms were mild and comprising of transient lower extremity

weakness, dizziness, and persistent pain, the incidence was higher in patients who underwent multiple nerve root blocks. Although multiple nerve root blocks may lead to adhesions around the nerve root and increase the risk of complications, no such complications were observed in any of our patients who were all over 80 years old. Taking this data into consideration, Selective nerve root block or Transforaminal epidural injection can be performed relatively safer way, even in the elderly patients.

There are a couple of limitations to this study, like limited number of cases which if increased may reveal a significant difference between effective and ineffective groups. Secondly, there was inability to score pain improvement measures like the VAS in quite a number of our cases owing to the older patients that were the study population associated with difficulty to match the VAS with verbal pain improvement and to reproduce the assessment by the VAS. It was feasible to follow the transition of symptoms through the statements of patients and family members in the medical record adequately. Lastly, the low follow up rate due to comorbidity worsening and refrained from seeing the doctor over the past few years due to COVID-19. To counter this issue, performing follow-up surveys by phone, could have been considered.

CONCLUSIONS:-

In this study, Selective nerve root block or Transforaminal epidural injection was effective in more than 60% of older patients with Lumbar spinal canal stenosis. The therapeutic effect of Selective nerve root block or Transforaminal epidural injection may be lower in cases of advanced Lumbar spinal canal stenosis and in those with a long disease duration. Selective nerve root block or Transforaminal epidural injection may be a relatively safe treatment option for older patients with various perioperative risks.

Table 1: Results of each category between the effective and ineffective groups

	Effective Group (n=35)	Ineffective Group (n=25)	p-value
Spinal canal area	107.8	76.6	0.0094
Disease duration (months)	7.8	17.9	0.113
Number of blocks (times)	4	5	0.598
Lumbar disc herniation rate (%)	40	48	0.54

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