Original Research Paper

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Orthopaedics

FACTORS INFLUENCING THE OUTCOME OF SELECTIVE NERVE ROOT BLOCK IN MANAGEMENT OF LUMBAR RADICULOPATHY

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ABSTRACT Selective nerve root block (SNRB) is an approved procedure in management of lumbar radicular pain. The aim was to study the determinants that influence the therapeutic effectiveness of selective nerve root injection in treatment of patients with Lumbar radicular pain. **Materials & Methods:** 28 patients between July 2020 o May 2022 with lumbar radicular pain underwent SNRB . All Selective Nerve Root Blocks were performed as inpatient procedures without premedication. Pain severity was evaluated using various assessment scales (visual analogue scale, Rolland – Morris scale,) and results are analyzed both pre procedure and post procedure. Various parameters like age, sex, nature of work, duration of symptom, amount of pain relief, ability to return back to their regular activities were assessed. **Results:** In our study we found that selective nerve root block was more effective in patients presenting with acute symptoms, who are moderately built, with MSU 2AB grading and who were engaged in moderate level of physical occupation with maximum VAS & RMDQ score at the time of presentation. SNRB was less effective in obese patient of more than 80 kgs, BMI of < 28. **Conclusion:** Nerve Root Block is an effective therapeutic tool for Lumbar Radicular pain and should be recommended as the initial treatment of choice for this condition. Various constitutional, environmental and behavioral factors influence the outcome.

KEYWORDS : SNRB – Selective nerve root block, VAS – Visual Analogue Scale, RMDQ – Rolland Morris Disability Questionnaire.

INTRODUCTION

Macnab first described selective nerve root blocks in 1971[1]. This infiltration performed with contrast agent and lidocaine aimed to differentiate different sources of leg pain in an equivocal clinical situation. So far, the diagnostic aspect[2] has been the predominant reason for a nerve root block. A systematic analysis of the therapeutic effect of nerve root blocks has so far not been extensively studied. This study is aimed to analyze the factors influencing the outcomes of selective nerve root block in management of patients with sciatica.

Aims and Objectives

To conduct a prospective study

1. to evaluate the patients presenting with sciatica both clinically & radiologically.
2. To assess the adequacy of relief provided by Nerve Root Block for Lumbar Radicular pain.
2. To analyze the various parameters which influence the effectiveness of selective nerve root injection in treatment of patients with Lumbar radicular pain.

Inclusion criteria:

1. low back ache not relieved by medicines and physical methods
2. radiating pain to lower limb not relieved by medicines and physical method
3. positive Lasegues test

Exclusion criteria

- Presence of neurological deficit
- Local infection
- Coagulopathies

Materials And Methods

Study population

The study population consisted of consecutive, eligible sciatic patients with unilateral symptoms to below the knee that had lasted 3 to 28 weeks. Leg pain had to be at least comparable with that of back pain. A positive dural tension sign (limited straight leg raising) was a prerequisite for entry. The patients had come to the out patient department of Orthopaedics, Chengalpattu Medical College Hospital,Chengalpattu, Tamil Nadu. India The study protocol was approved by the College ethics committee. MRI was done in all patients as a standard protocol to look for mechanical lesions.

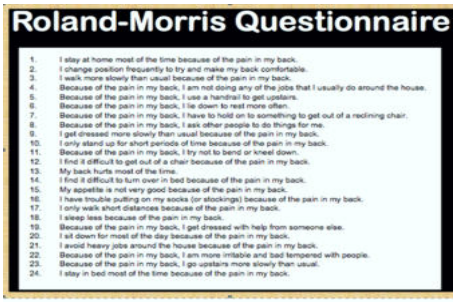
Evaluation of patients

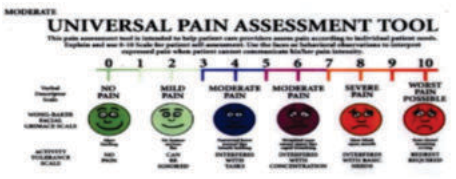
The self-administered questionnaire items included education, estimation of physical workload, mental job stress, smoking, medical history (including back pain and sciatica) and history of current episode. Job status of those patients currently employed was characterized by a 3-scale classification (sedentary job, mixed job and physical job) (Ilmarinen *et al*. 1985).Every patient recorded his/her back pain and leg pain on 10 VAS scales and disability with the Disability Questionnaire (RMDQ)[3].

Technique:

All Selective Nerve Root Blocks were performed as inpatient procedures without premedication. Informed consent was obtained. Under aseptic precautions, under X ray fluoroscopy guidance, the nerve root was identified. 1 ml of lignocaine and 1 ml of Depomedrol is injected at the nerve root All patients underwent a standardized program of intensive physical therapy, which included procedures for local pain relief and reconditioning exercises for the spinal muscle, for at least 6 weeks after the procedure.

Pain severity was assessed immediately after the procedure and after 4hrs. Then after 8 hrs, 24hrs. Patient was discharged the next day. Follow up was done weekly for upto 1 month . Then monthly for 6 months. Pain severity was evaluated using various assessment scales (visual analogue scale, Rolland – Morris[2] scale,) and results are analyzed both pre procedure and post procedure. Various parameters like age, sex, nature of work, duration of symptom, amount of pain relief , ability to return back to their regular activities were assessed .And the role of selective nerve root block in management of Lumbar Radicular syndrome was studied.





OBSERVATIONS:

Age :
In our study , the incidence of Sciatica was more in the fourth decade constituting 71.4% (n= 20). Followed by the fifth decade 17.9%. 3 cases were above 60 years.

Sex:
In our study sciatica was common among males N= 25 (89.3).

Side :
Left sided Sciatica was more than Right side constituting 67.9% (n=19)

Level :
the lesion was more common at L4 – L5 level (75%) N = 21.

Occupation :
Sciatica was most prevalent among drivers (n=5) and manual laborers (n= 4) constituting 32% of the total number. The level of occupation was classified as sedentary , moderate & Heavy.

Duration Of Symptoms:
Patient presented to the hospital more between 5 – 8 weeks of onset of symptoms (n=11). Followed by 9 – 12 weeks (n = 7). 3 patients had symptoms for more than 6 months.

Height :
Sciatica was found to be common is the height group of 161 – 170cm. (n = 18)

Weight :
In our study patient in the weight group of 71 – 75 Kgs had more incidence of Sciatica (n=10)

Bmi :
5 pateints were BMI below 25 , which corresponded to normal. 17 pateints had a BMI between 25 -28. 6 patients had BMI of above 28

Msu Grading:
In our study 13 cases had a MSU Grade of IB , followed by 11 cases with 2 AB . 4 cases had 2B MSU Grade.

Vas Score :
mean pre VAS SCORE before SNRB was 8.03 with a range of 7 to 9.

Rmdq Score :
The mean RMDQ score before SNRB was 20.07 (range of 16 – 22).

Observations:

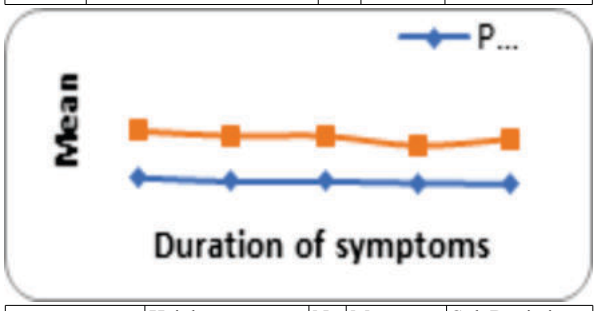
Pre Procedure:
SCIATICA was predominant among males during the fourth decade. It was more prevalent among heavy laborers. left side involvement was more common. L4 – L5 level was more involved.

- Patients presented for treatment mostly after 5 -8 weeks of onset of symptoms. 2B MSU grading of lesion was most common in MRI Grading. The mean VAS score was 8.0 & the mean RMDQ score was 20.07.
- The Pre VAS Score was maximum (VAS -9) for patients who presented acutely within less than 4 weeks of onset of symptoms.
- The Pre VAS Score was minimum (VAS – 7.33) for patients who presented late after 18 weeks.
- The RMDQ Score was maximum (21.4) for patients during the acute stage of Sciatica. The RMDQ Score was least (17.5)for patients who presented between 13-18 weeks of onset of symptoms.
- Tall patients with Height in the range of 171 -180 (n = 7) had higher pre procedure VAS & RMDQ Scores
- More Obese patients with weight > 80 kgs(n= 5) had high Pre procedure VAS Scores. The RMDQ Score was more among less obese patients with weight in the range of 65 – 70 Kgs.
- The pre VAS Score was high among moderately obese patients. The pre procedure RMDQ Score was higher in normal weight category
- The Pre Procedure VAS & RMDQ Score was maximum in 2B type of MSU Disc lesion and was minimum for 1B type of MSU Disc lesion.
- The Pre procedure VAS & RMDQ Score was maximum in type 3 level of heavy occupation(n=20).
- Patients were on follow up for a minimum of 6 months. 12 patients were on 6-8 months of follow up. 10 patients were on 9-11 months of follow up. 3 patients were on more than 11 months of follow up.

Post Procedure:

- The mean VAS SCORE before the SNRB procedure was 8.03. It reduced to a mean of 1.32. 6 hours after SNRB. So there was 83.56 % reduction in the VAS Score immediately after SNRB. The mean VAS Score after 48 hrs was 2.21, which is 72.48% reduction from PRE SNRB VAS Score .
- The mean RMDQ Score was 20.07 before SNRB procedure . It reduced to a mean of 11.14 at 1 week after SNRB procedure. So there was 45 % reduction in the RMDQ Score.The Mean RMDQ Score reduced to a mean of 9.8 after 1month, 9.48 after 3 months, 9.60 after 6 months of follow up. So at the end of 6 months of follow up (n=25) there was 52% reduction in RMDQ Score .
- Patients who presented with acute sciatica between 1-4 weeks and who had the maximum VAS Score(9.0) before the procedure had maximum reduction in VAS Score (0.80) after the procedure.(%)
- Patients who presented late after 18 weeks of onset of symptoms, who had the minimum VAS Score (7.33) before the procedure had least reduction in post SNRB VAS Score(5.33).
- There was not much significant variation in pre SNRB VAS Scores , pre SNRB RMDQ Scores and post procedure with regard to height. The percentage of reduction in scores, were almost equal in all height groups.
- The percentage of reduction in RMDQ Scores was maximum with moderately obese individuals and least with patients who were > 80 kgs.
- There was least reduction in VAS Score among patients with BMI above 28. There was no significant variation in POST SNRB Score in reference to BMI.
- 2AB type of MSU Graded disc lesions had very favorable reduction in RMDQ Scores.
- Patients who had higher VAS Scores & higher RMDQ Scores had `the highest reduction percentage after the SNRB.

	Duration of symptoms	N	Mean	Std. Deviation
Pre – vas scores	1-4 Weeks	5	9.0000	.00000
	5-8 Weeks	11	7.9091	.83121
	9-12 Weeks	7	8.0000	.57735
	13-18 weeks	2	7.5000	.70711
	Above 18 weeks	3	7.3333	.57735
	Total	28	8.0357	.79266
Pre – rms score	1-4 Weeks	5	21.4000	.89443
	5-8 Weeks	11	20.0909	1.51357
	9-12 Weeks	7	20.1429	2.26779
	13-18 weeks	2	17.5000	2.12132
	Above 18 weeks	3	19.3333	2.30940
	Total	28	20.0714	1.88421



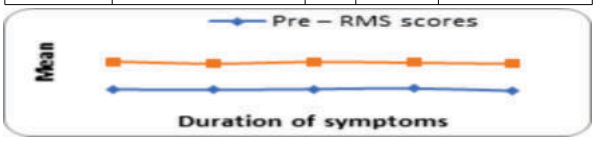
	Height	N	Mean	Std. Deviation
Pre – rms score	150-160 cms	3	19.0000	.00000
	161-170 cms	18	20.2778	2.05242
	171-180 cms	7	20.0000	1.82574
	Total	28	20.0714	1.88421
At 6 month Rms score	150-160 cms	3	9.3333	1.15470
	161-170 cms	16	9.7500	1.77012
	171-180 cms	6	9.3333	1.03280
	Total	25	9.6000	1.52753

	Weight	N	Mean	Std. Deviation
Pre – rms score	65-70 Kgs	8	20.6250	1.68502
	71-75 Kgs	10	20.2000	1.93218
	76-80 Kgs	5	19.2000	2.04939
	>80 Kgs	5	19.8000	2.16795
	Total	28	20.0714	1.88421

At 6 month Rms score	65-70 Kgs	7	9.7143	1.70434
	71-75 Kgs	9	9.3333	1.65831
	76-80 Kgs	5	10.6000	1.14018
	>80 Kgs	4	8.7500	.95743
	Total	25	9.6000	1.52753

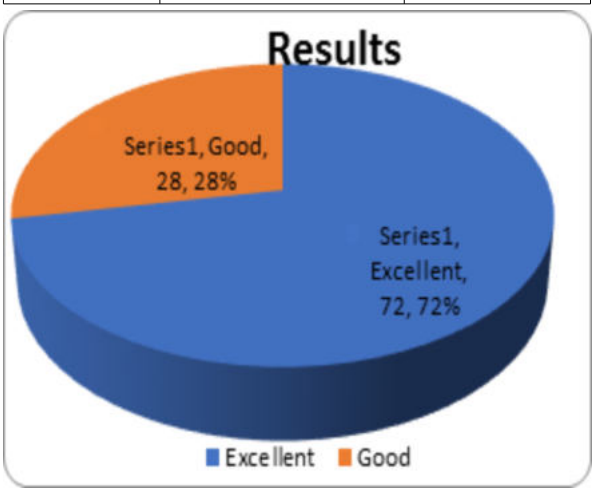
	MSU Grading	N	Mean	Std. Deviation
Pre – rms score	1B	13	19.6923	2.01596
	2B	4	20.7500	1.25831
	2AB	11	20.2727	1.95402
	Total	28	20.0714	1.88421
At 6 month Rms score	1B	13	10.0769	1.55250
	2B	4	10.2500	.95743
	2AB	8	8.5000	1.19523
	Total	25	9.6000	1.52753

	Level of occupation	N	Mean	Std. Deviation
Pre – rms score	1	3	20.3333	1.52753
	2	5	19.4000	2.07364
	3	20	20.2000	1.93581
	Total	28	20.0714	1.88421
At 6 month Rms score	1	2	9.5000	.70711
	2	5	9.8000	1.30384
	3	18	9.5556	1.68810
	Total	25	9.6000	1.52753



RESULTS

Results	No. of patients	Percentage
Excellent	18	72.0
Good	7	28.0
Total	25	100.0



DISCUSSION:

Data on the determinants of sciatica are largely based on cross-sectional studies, although longitudinal cohort studies potentially yield more relevant information. Determinants of lumbar disc disease (herniated disc or typical sciatica) are reviewed in two parts: constitutional factors such as body height, age, gender and obesity; environmental and behavioural factors such as occupation, smoking, leisure time activities and psychological factors;

Constitutional factors

Sciatica and risk of undergoing surgery is highest during the fourth and fifth decades of life (Kelsey & Ostfeld 1975, Frymoyer 1988). This age-related vulnerability is also supported by findings from cadaver studies (Adams & Hutton 1982), and it may be related to greater prevalence of disc ruptures. The reduced incidence of disc herniation in old persons may be related to the loss of turgor and elasticity of discs with age[4]. Male predominance of HNP has been observed among patients hospitalized for sciatica (Spangfort 1972, Naylor 1974, Thomas *et al*. 1983). On the other hand, in one study prevalence of sciatic symptoms did not differ between males and females[8].

Body height seems to predispose to sciatica (Hrubec & Nashold 1975, Weir 1979,Merriam *et al*. 1983), although in some studies no association was found (Kelsey &Ostfeld 1975, Kelsey *et al*. 1984). The relative risk increased on average by 5 % among men and 4 % among women per one centimetre increase in body height[5]. The risk was evident above heights of 180 cm for men and 170 cm for women(Heliövaara 1987a).Obesity measured as body mass index has been found to be a significant predictor of disc disease only in men (Heliövaara 1987a). Herniations are often found in asymptomatic subjects (Boden *et al*. 1990, Jensen *et al*. 1994), but narrowing of the lumbar canal may predispose to symtomatic disc lesions and sciatica as the space is limited (Porter *et al*. 1978, Heliövaara *et al*. 1986).

Environmental and behavioural factors

Heavy physical loading and materials handling, including lifting, bending, twisting,sitting and sustained nonneutral postures predispose to low back pain (Magora 1973).Similarly, hard physical jobs and, in particular, frequent lifting and postural stress are known to increase the risk of sciatica[7] . Motor vehicle driving is also positively associated with HNP and sciatica (Kelsey & Hardy 1975, Kelsey *et al*. 1984, Heliövaara 1987b). The incidence of sciatica during a 3-year follow-up period was 22% for machine operators, 24% for carpenters and 14% for office workers (Riihimäki *et al*. 1994). However, lifetime loading is more relevant than current conditions (Videman & Battie 1999)[9]. Moreover, many occupations are also associated with various lifestyle factors that can act as confounding factors in attempts to determine occupational effects (Ilmarinen *et al*. 1991). When lumbar disc degeneration among Finnish twins was studied, heavier lifetime occupational and leisure physical loading was associated with greater disc degeneration at the upper lumbar levels, whereas sedentary work was associated with lesser degeneration (Battie *et al*. 1995). Accident-related trauma has also been suspected of causing structural damage and accelerating degenerative changes (Videman *et al*. 1990). The risk of sciatic pain has indeed been reported to be increased among workers who had earlier had back accidents (Riihimäki 1985, Riihimäki *et al*. 1989, Heliövaara *et al*. 1991).Self-assessed stenuousness of work was a significant risk factor for sciatica in women (Heliövaara 1987b). In a Finnish follow-up study, distress symptoms predicted hospital admissions for HNP or sciatica among women who reported no severe back trouble at entry (Heliövaara *et al*. 1987b, Heliövaara *et al*. 1991). The findings are in agreement with a recent experimental study where the influence of psychosocial stress, gender and personality on mechanical loading of the lumbar spine was evaluated (Marras *et al*.2000). Psychosocial stress increased spine compression and lateral shear on the basis of differences in muscle coactivation. Women's anterior-posterior shear forces increased in response to stress, whereas men's decreased. Certain personality traits (e.g. introverts and thinkers) were associated with increased spine loading compared with those with an opposing personality trait, and explained loading differences between subjects (Marras *et al*. 2000).

The effect of smoking on the incidence of sciatica is controversial. In a Finnish followup study, smokers and ex-smokers had a similar increased risk of sciatica[6], whereas in other studies smoking was of borderline or no significance (Heliövaara *et al*. 1987b, Riihimäki *et al*. 1994).

CONCLUSION :

In our study we found that selective nerve root block was more effective in patients presenting with acute symptoms, moderately built, with MSU 2AB grading and who where engaged in moderate level of physical occupation with maximum VAS & RMDQ score. SNRB was less effective in obese patient of more than 80 kgs, BMI of > 28 .

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