

Functional Outcome Following Posterior Decompression For Lumbar Canal Stenosis Using Spinaplasty Technique

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Abstract: Background: Lumbar spinal canal stenosis is one of the most common cause of chronic back pain in middle aged and elderly patients. The incidence of acquired lumbar stenosis is approximately 1 per 1000 in individuals older than 65 years. Aim: to find the functional outcome following posterior decompression for lumbar canal stenosis using spinaplasty technique. **Material and methods:** Present study was a observational study done in department of orthopaedics in tertiary care hospital. Totally 22 patients were included in the study out of which 2 patients were excluded due to loss of follow up. All patients underwent wide posterior decompression surgery at respective levels using spinaplasty technique. Wound was inspected every 3 days and IV antibiotics (cefoperazone+ sulbactam) was given for the first 3 days which were then changed to oral antibiotics(ceftriaxone) following surgery. No patient had surgical site infections/ dural leak/ post operative fresh neurological deficits. Surgical staples were removed on post operative day12 patient were mobilized using lumbar brace. **Results:** The mean intensity of back pain pre operatively was 5.05, post operatively it was reduced to 3.00 at 1 month,2.35 at 3months and 1.95 at 6months follow up. **Conclusion:** The described technique wide posterior decompression using Spinaplasty technique for lumbar canal stenosis preserves the posterior ligamentous complex by repairing the median structures i.e spinous process, interspinous ligament and supraspinous ligament by lifting them as a single piece and repairing after decompression.

Keywords: Functional Outcome, Lumbar Canal, Spinaplasty

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INTRODUCTION

Lumbar spinal canal stenosis is one of the most common cause of chronic back pain in middle aged and elderly patients. ¹The incidence of acquired lumbar stenosis is approximately 1 per 1000 in individuals older than 65 years². Posterior midline wide decompression has been most widely used treatment for lumbar spinal stenosis which includes removal of spinous process, interspinous ligament, lamina and ligamentum flavum. ³But it jeopardize the integrity of posterior complex of spine, which may cause post-operative instability. ⁴ In Spinaplasty technique⁵ the integrity of posterior complex is maintained by repairing median structures. In this technique we lift the posterior ligamentous complex i.e. spinous process, interspinous ligament and supraspinous ligaments as a single piece and repaired after spinal decompression. So stability of lumbar spine is maintained⁵.

Aim: to find the functional outcome following posterior decompression for lumbar canal stenosis using spinaplasty technique.

MATERIAL AND METHODS:

Present study was a observational study done in department of orthopaedics in tertiary care hospital. Totally 22 patients were included in the study out of which 2 patients were excluded due to loss of follow up. All patients who were diagnosed as lumbar spinal canal stenosis and fulfilling the inclusion criteria were taken into the study. Anteroposterior diameter of central canal <13mm, lateral foraminal width <4mm, lateral recess height <5mm in MRI was considered as diagnostic of Lumbar spinal stenosis ^{6,7}. Written informed consent was taken from each patient who participated in the study. Pre-operatively patient was evaluated clinically using Neurogenic claudication outcome score(NCOS)⁵ and radiologically using lateral flexion and extension spine X-rays. All patients underwent wide posterior decompression

Article Title: Functional Outcome Following Posterior Decompression for Lumbar Canal Stenosis

surgery at respective levels using spinaplasty technique. Post operatively all patients are followed at 1month,3months and 6 months to check functional outcome (back pain, radiating pain, NCOS score) and lumbar stability using flexion and extension X-rays.

RESULTS:

Table 1 : Distribution of Back pain among the study population

	N	Mean	Std. Deviation	Friedman test value	p value	Percentiles		
						25th	50th (Median)	75th
Pre Op	20	5.05	.999	53.564	.000	4.25	5.00	5.75
1month	20	3.00	.795		HS	2.00	3.00	4.00
3months	20	2.35	1.040			1.25	2.00	3.00
6months	20	1.95	1.050			1.00	2.00	3.00

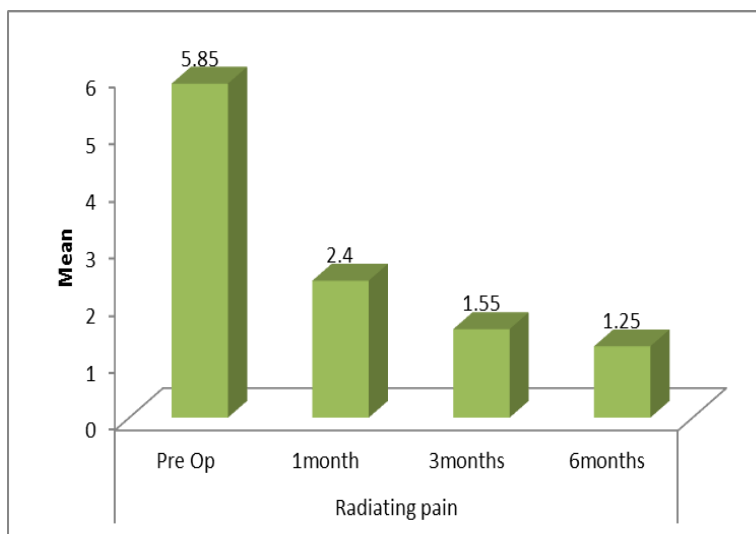


Figure 1: Distribution of Radiating pain among the study population

Table 2: Distribution on recovery rate

		Count	Column N %
Recovery Rate at 1month	Poor	9	45.00%
	Fair	11	55.00%
	Good	0	0.00%
	Excellent	0	0.00%
	Total	20	100.00%
Recovery Rate at 3months	Poor	3	15.00%
	Fair	14	70.00%
	Good	3	15.00%
	Excellent	0	0.00%
	Total	20	100.00%
Recovery Rate at 6months	Poor	3	15.00%
	Fair	10	50.00%
	Good	7	35.00%
	Excellent	0	0.00%
	Total	20	100.00%

Table 3 : Neurogenic claudication distance(NCD)

		Count	Column N %
NCD Pre Op	<100Y	6	30.0%
	100Y-1/2M	14	70.0%
	Total	20	100.0%
NCD 1month	<100Y	3	15.0%
	1/2M-1M	2	10.0%
	100Y-1/2M	15	75.0%
	Total	20	100.0%
NCD 3months	<100Y	1	5.0%
	>1M	1	5.0%
	1/2M-1M	6	30.0%
	100Y-1/2M	12	60.0%
	Total	20	100.0%
NCD 6months	<100Y	1	5.0%
	>1M	4	20.0%
	1/2M-1M	7	35.0%
	100Y-1/2M	8	40.0%
	Total	20	100.0%

There was significant improvement in back pain, radiating pain,neurogenic claudication distance, Neurogenic claudication outcome score following posterior decompression with spinaplasty technique.⁵

All above mentioned parameters are compared pre op and post operatively at 1 month,3months and 6 months follow up using Wilcoxon signed rank test and Friedman test the results were statistically significant and p value is less than 0.01 which was highly significant. There was no instability post operatively in all patients which was assessed post operatively at 3months and 6 months using lateral flexion and extension radiographs of lumbosacral spine.

DISCUSSION:

Pokral et⁷ al followed up 22 cases of degenerative lumbar spinal canal stenosis who underwent laminectomy with preservation of posterior osteoligamentous structures in which all cases had significant improvement in radicular pain and neurogenic claudication, but 18 % had complaints of persistence back pain.

The other studies with similar results Ganz et al¹³ and Tenhula et al¹² which suggest that leg pain improved significantly following surgical decompression while there was no significant improvement in back pain.

Functional outcome at 1month,3months and 6 months : At 1 month of follow up 55% (n=11) patients had fair outcome while 45% (n=9) had poor outcome following posterior decompression with spinaplasty technique. Pokral et⁷ al followed up 22 cases of degenerative lumbar spinal canal stenosis who underwent laminectomy with preservation of posterior osteoligamentous structures, in which 82% patients were fully satisfied. Surendra Mohan Tuli et al⁵ followed up 610 patients of degenerative lumbar canal stenosis who underwent multiple laminectomis with spinaplasty technique, none of the patient developed pain or catch while doing flexion –extension, active lateral bending and rotation movements.

Other studies Pokrel et al⁷,Bresman et al⁸,Daipayana Guha et al¹⁰,Chen LH et al¹¹ studies emphasized that laminectomy with preservation posterior ligament complex decreases the risk of development of de novo instability post operatively.

Shekin HA et al¹⁴,Lee CK¹⁵ et al studies reported 3-20% instability following extensive decompressive laminectomy after 5-10 years post operatively where posterior ligamentous complex structures were not preserved. Vrankonic et al¹⁶ evaluated lumbar spine stability following laminectomy with or without spinous process plasty, In a group where spinous process plasty done(n=41) showed only 3.8% radiological instability after 2years of follow up in comparison to 25% patients without spinous process plasty.

CONCLUSION:

The described technique wide posterior decompression using Spinaplasty technique for lumbar canal stenosis preserves the posterior ligamentous complex by repairing the median structures i.e spinous process, interspinous ligament and supraspinous ligament by lifting them as a single piece and repairing after decompression. This technique is relatively simple, time saving and provides adequate access for neural decompression with least disturbance to stability, mobility and lumbar lordosis. At 6 months follow up in our study most of the patients had statistically significant improvement in functional outcome and no one developed de novo instability.

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