

Functional Outcome of Surgical Management of Lumbar Spinal Stenosis

Hitesh Sehrawat¹, Amit Dwivedi², Tushar Sachdev³ and Vikram Dagar⁴

¹ Santosh Medical College Hospital

Received: 14 December 2018 Accepted: 3 January 2019 Published: 15 January 2019

Abstract

Aims and Objectives: To determine the functional outcome after surgical management of lumbar spinal stenosis. **Materials and Methods:** In this study 20 patients of lumbar spinal stenosis were enrolled. All the Patients were managed with three different surgical techniques according to pre-formulated indications. JOA scoring system for low backache was used to assess the patients. The recovery rate was calculated as reported by Hirabayashi et al. (1981). Surgical outcome was assessed on the recovery rate and was classified using a four grade scale: Excellent, improvement of >90

Index terms— spinal stenosis, Japanese orthopedic association score, recovery rate.

1 I. Introduction

Spinal stenosis is the narrowing of the spinal canal, the lateral nerve root canals, or the neural foramen. This narrowing derives from facet or ligamentum flavum hypertrophy, extruded disc, spondylolisthesis or any combination of the above. It may form part of a generalized degenerative process at several spinal levels or may be more localized.

In lumbar spinal stenosis, spinal canal narrows and leads to compression on the spinal cord and nerve roots. Symptoms include low back pain, neurological claudication and neurological deficit.

Prolapse intervertebral disc occurs in about 5-10% of all low backache patients and is a common cause of sciatica. Disc prolapse alters the disc height and mechanics of the rest of the spinal column, possibly adversely affecting the behavior of other spinal structures such as muscles and ligaments. The standard treatment of prolapsed lumbar disc has been surgical excision of the disc or conservative treatment, though the methods vary.

The first disc prolapse operation falsely accredited to Mixter and Barr was conducted by Oppenheim and Krause in Berlin but it was interpreted as an enchondroma of spinal disc. Mixter and Barr's 1 classical paper "Rupture of inter vertebral disc with involvement of spinal canal" opened an era of systematic diagnosis and operative treatment of lumbar disc prolapse. Their approach showed the effectiveness of Laminectomy and Discectomy in its management and since then there has been an ever increasing enthusiasm to solve sciatica problems surgically by disc excision. Although minimally invasive operations such as percutaneous nucleotomy 2,3 and microendoscopic 4 discectomy have gained attention in recent years, standard discectomy is still the preferred management technique among the majority of surgeons, and its favorable outcomes and affordability have been reported. 5 Other mode of treatment, "active" nonoperative treatment is also used, except in patients with progressive neurologic deficit and cauda equina syndrome, both of which are indications for urgent decompression 6. Hence any surgical intervention without appropriate conservative therapy leads to unnecessary surgery and also a poor outcome. 7 With the basic understanding of disease process, new diagnostic techniques, refinements in conservative treatment and discectomy, improvements in surgical instrumentation revealed that surgical removal of the offending disc herniation is reasonably safe procedure with satisfactory results. Mortality of this surgery is almost negligible. Thus the present study was undertaken to study the functional outcome of the surgical management of degenerative lumbar canal stenosis.

2 JOA SCORE

3 II. Material and Methods

The present study was conducted during Jan 2016 to Feb 2017 in santosh hospital, ghaziabad. Total 20 patients of lumbar spinal stenosis were enrolled in the study using following inclusion and exclusion criteria. Laminectomy with Discectomy, Laminectomy with Discectomy with Posterior spinal fusion or Laminectomy with Discectomy with Posterior Instrumentation, Inter body cage. All the patients were followed for one year at fixed interval (3 months, 6months and 1 year) to study the outcome.

Pre and post operative assessment of the patients was done according to JOA evaluation system for low back pain. The JOA score was determined by direct questions to evaluate symptoms, signs, and restriction of daily living activities. The recovery rate was calculated as reported by Hirabayashi et al. 8 Recovery rate (%) = (Postoperative score -Preoperative score) / (29 -Preoperative score) \times 100.

Rate of Recovery was classified as: Excellent, > 90 %, good, 75-89 %; fair, 50-74 %, and poor, below 49 %. It was observed that majority of the patients were more than 55 years old (65%). And it has male predominance (65%). 30% patients were having Claudication distance less than 100 meters. Laminectomy with Discectomy with Posterior spinal fusion was performed in 60% cases and it was followed by Laminectomy with Discectomy in 30% patients. It was seen that majority of the patients (55%) in the study were having JOA scores less than 19 preoperatively. On post operative 3rd month 75% patients were having scores 20 and above whereas on post operative 6 th month proportion was increased to 95%. On post operative one year no patient was having scores less than 20. Outcome of the surgical procedure was calculated by using the recovery rate. It was observed that 50% patients were having good functional outcome whereas 10% were having excellent outcome. Fair outcome was observed in 35% patients and poor in 5% patients.

4 III. Results

5 IV. Discussion

The present study was undertaken to study the functional outcome of surgical management of lumbar spinal stenosis. Japanese orthopedic association score (JOA) was used to measure the functional outcome. It was observed that majority of the patients in the study were more than 55 years old (65%).

It was also observed that 30% patients were having Claudication distance less than 100 meters. Majority of cases came with complaints of low backache and radicular pain. The duration of symptoms varied from 1 month to 5 years. Most of patients had a positive SLRT along with neurological deficit & paraspinal spasm. Laminectomy with Discectomy with Posterior spinal fusion was the most commonly (60%) performed procedure.

55% patients in the study were having JOA scores less than 19 preoperatively. Improvement in the JOA score was observed postoperatively. And after one year of surgery no patient was having scores less than 20.

The formula of recovery rate was used to calculate the functional outcome of the surgery [9][10][11][12] . 50% of patients were having good functional outcome and 10% were having excellent outcome. Fair outcome was observed in 35% patients and poor in 5% patients.

Ganz et al ??? (1990) reported almost similar result showing 86% good outcome in their series of 33 patients treated by de-compressive surgery. Weinstein et al ??? (2010) showed that patients with degenerative spondylolisthesis and spinal stenosis treated surgically showed substantially greater improvement in pain and function during a period of 2 years than those treated non-surgically.

Weber et al 11 and Spengler DM et al 15 also reported higher proportion of good and excellent outcome in surgically treated groups.

Thus we could say that operative treatment in patients of lumbar spinal stenosis yields excellent long term functional results as observed on the basis of JOA scoring system provided that patients are properly selected and de-compressive surgery is performed simultaneously addressing the associated instability orlisthesis. Majority of the activities of daily living which were assessed using JOA score showed significant improvement. On the basis of these results and discussion we could conclude that Operative treatment in patients of lumbar spinal stenosis yields good to excellent results as observed on the basis of JOA scoring system. ¹

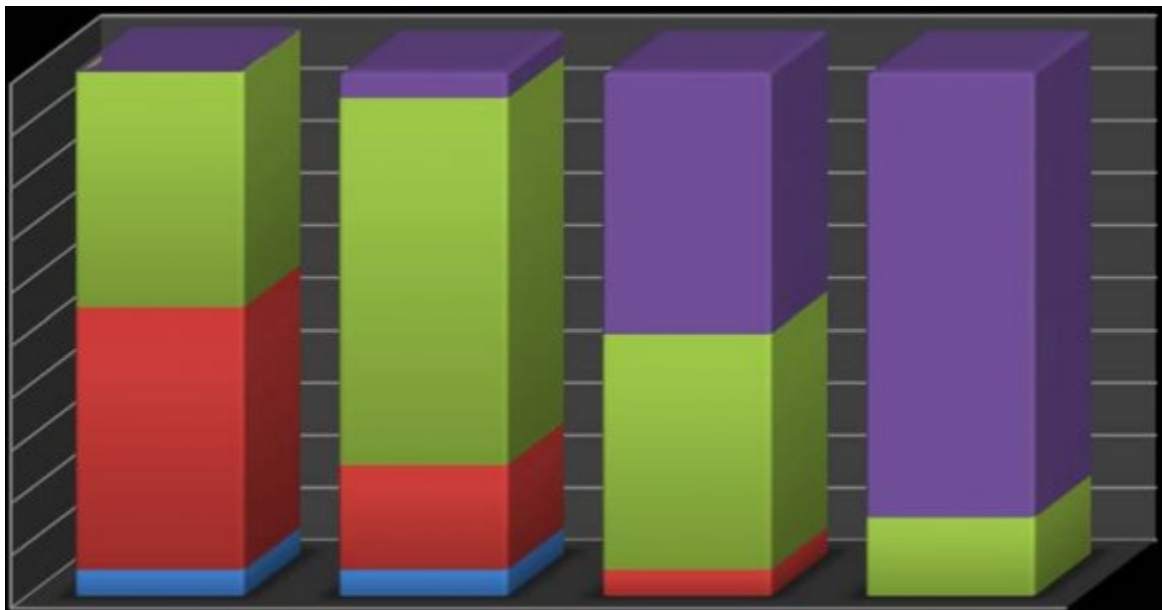


Figure 1: ?

1

	Variable	No. (n = 20)	%
Age	? 50 yrs	4	20
	51 -55 yrs	3	15
	56 -60 yrs	6	30
	61 -65 yrs	4	20
	66 -70 yrs	3	15
Sex	Female	7	35
	Male	13	65
Claudication Distance	< 100 m	6	30
	101 -200m	7	35
	201 -300m	4	20
Procedure	301 -400m	3	15
	Laminectomy with Discectomy	6	30
	Laminectomy with Discectomy with Posterior Spinal Fusion	12	60
	Laminectomy with Discectomy with Posterior Instrumentation with Interbody Cage Fixation	2	10

Figure 2: Table 1 :

2

Score	Pre Operative	3 Month	Post Operative 6 Month	1 Year
10-14	1 (5%)	1 (5%)	0	0
15-19	10 (50%)	4 (20%)	1 (5%)	0
20-24	9 (45%)	14 (70%)	9 (45%)	3 (15%)
25-29	0	1 (5%)	10 (50%)	17 (85%)

[Note: H Chart 1: Distribution of Patients According to JOA Scores]

Figure 3: Table 2 :

3

Outcome	No. (n = 20)	%
Excellent	2	10
Good	10	50
Fair	7	35
Poor	1	5

Figure 4: Table 3 :

-
- [Sharma and Sankaran (1980)] *A Clinical Profile of Prolapse Lumbar Intervertebral Disc and its Management*, S Sharma , B Sankaran . 1980 October 1. 1980. p. .
- [Davis ()] 'A long-term outcome analysis of 984 surgically treated herniated lumbar discs'. R A Davis . 10.3171/jns.1994.80.3.0415. 8113853. *Journal of neurosurgery* 1994. 80 (3) p. .
- [Hijikata and Percutaneous ()] 'A new concept technique and 12 years' experience'. S Hijikata , Percutaneous . 2910622. *Clinical orthopaedics and related research* 1989. (238) p. .
- [Frymoyer ()] *Back pain and sciatica. The New England journal of medicine*, J W Frymoyer . 10.1056/NEJM198802043180506. 2961994. 1988. p. .
- [Porter and Hibbert ()] 'Calcitonin treatment for neurogenic claudication'. R W Porter , C Hibbert . 6359471. *Spine* 1983. 8 (6) p. .
- [Katayama et al. ()] 'Comparison of surgical outcomes between macro discectomy and micro discectomy for lumbar disc herniation: a prospective randomized study with surgery performed by the same spine surgeon'. Y Katayama , Y Matsuyama , H Yoshihara , Y Sakai , H Nakamura , S Nakashima . 16826006. *Journal of spinal disorders & techniques* 2006. (5) p. .
- [Spengler et al.] 'Elective discectomy for herniation of a lumbar disc'. D M Spengler , Ouellette E A Battie , M Zeh , J . 2303509. *The Journal of bone and joint surgery American* (2) p. . (Additional experience with an objective method)
- [Nath et al.] 'Functional outcome of surgical management of degenerative lumbar canal stenosis'. R Nath , S Middha , A K Gupta , R Nath . 10.4103/0019-5413.96380. 22719114. PMC3377138. *Indian journal of orthopaedics* 2012 (3) p. . (Pub Med)
- [Weber ()] 'Lumbar disc herniation. A controlled, prospective study with ten years of observation'. H Weber . 6857385. *Spine* 1983. 8 (2) p. .
- [Ganz ()] 'Lumbar spinal stenosis: postoperative results in terms of preoperative posture-related pain'. J C Ganz . 10.3171/jns.1990.72.1.0071. 2136756. *Journal of neurosurgery* 1990. 72 (1) p. .
- [Hirabayashi et al. ()] 'Operative results and postoperative progression of ossification among patients with ossification of cervical posterior longitudinal ligament'. K Hirabayashi , J Miyakawa , K Satomi , T Maruyama , K Wakano . 6792717. *Spine* 1981. 6 (4) p. .
- [Spengler and Freeman] 'Patient selection for lumbar discectomy. An objective approach'. D M Spengler , C W Freeman . 264029. *Spine* 1979 (2) p. .
- [Mochida et al. ()] 'Percutaneous nucleotomy in lumbar disc herniation. Patient selection and role in various treatments'. J Mochida , E Toh , K Nishimura , T Nomura , T Arima . 8278834. *Spine* 1993. (15) p. .
- [Mixer and Barr ()] 'Rupture of the intervertebral disc with involvement of spinal canal'. W J Mixer , J S Barr . *N Engl J Med* 1934. 211 p. .
- [Weinstein et al. ()] 'Surgical versus nonsurgical treatment for lumbar degenerative spondylolisthesis. The New England journal of medicine'. J N Weinstein , Lurie J D , Tosteson T D Hanscom , B , Tosteson A N Blood , EA . 10.1056/NEJMoa070302. 17538085. PMC2553804. *Pub Med* 2007. (22) p. .