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Original Research Article

Study of lumbar canal stenosis and its outcome after surgical management in central India

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ABSTRACT

Background: Lumbar canal stenosis is a painful and potentially disabling condition often encountered in adults. Treatment of lumbar canal stenosis may consist of conservative approach to lumbar canal stenosis consists of rest, lumbar bracing, activity modification and analgesics. Surgical management consists of decompressive laminectomy, laminotomy or facetectomy. In the present study, authors evaluate the outcome in patients of lumbar canal stenosis managed surgically with decompressive laminectomy.
Methods: A 50 patients with degenerative lumbar canal stenosis visiting Kasturbha hospital, Sewagram, Wardha from November 2016 to April 2017 were taken up for the study. Patients were taken up for laminectomy and decompression of the affected nerve roots using medial facetectomy. Post operatively patients were regularly followed up at monthly intervals. The ODI score was calculated at the end of 6 months and compared with the baseline score.
Results: Fifty patients (mean age-42.9 years) underwent laminectomy and decompression. Baselines ODI score was 71.2±6.4. After 6 month follow up, the score improved significantly to 21±15.6 which was statistically significant.
Conclusions: Operative treatment in patients of degenerative lumbar canal stenosis yields excellent functional results as observed based on the ODI score provided case selection is done properly.

Keywords: Lumbar canal stenosis, Laminectomy, ODI score

INTRODUCTION

Lumbar canal stenosis is a painful and potentially disabling condition often encountered in adults. It is defined as any narrowing of the lumbar spinal canal, nerve root canal, or intervertebral foramina.[1] Lumbar spinal stenosis is defined as narrowing of the neural canal and foramina to an extent that results in compression of the lumbosacral nerve roots or cauda equina.[2]

Van Akkerveeken classified lumbar canal stenosis on the basis of etiology into primary and secondary. Primary stenosis involves narrowing caused by congenital malformations or defects in postnatal development as in achondroplasia. Secondary lumbar canal stenosis occurs due to degenerative changes, spondylolisthesis, postsurgical scarring, lumbar intervertebral disc herniation, burst fracture of the vertebrae. Degenerative changes remain the most common cause of lumbar canal stenosis.[2-6]

The most common symptom associated with lumbar spinal stenosis is neurogenic claudication. It refers to pain that radiates from the back into the buttocks and frequently into the thigh and lower leg. Pain is exaggerated by extension of spine and improves with flexion. Spine extension occurs when walking downhill while flexion occurs on walking uphill. In addition to

pain, fatigue, heaviness, weakness and/or paraesthesia may also occur. Bladder and bowel complaints may also occur. Symptoms can be unilateral or more commonly bilateral and symmetrical.[3,4]

Treatment of lumbar canal stenosis may consist of conservative approach in the form of rest, lumbar bracing, activity modification and analgesics. Surgical management consists of decompressive laminectomy, laminotomy or facetectomy.[2,6,7] Epidural injections of steroids, analgesics have also been used for the treatment of lumbar canal stenosis with varying outcomes.[8,9] Very few studies exist on the outcome of laminectomy and decompression in rural masses. In the present study we evaluate the outcome in patients of lumbar canal stenosis managed surgically with decompressive laminectomy in patients of central rural india.

METHODS

Fifty patients with degenerative lumbar canal stenosis visiting Kasturbha hospital, Sewagram, Wardha from November 2016 to April 2017 were taken up for the study. Diagnosis of lumbar canal stenosis was made radiologically on MRI by presence of lumbar spinal canal antero-posterior diameter of 10mm or less.[10] Patients with low back pain, with pain radiating to lower limbs or with low back pain who presented with failure of conservative treatment for at least 3months were taken up for the study. Patients with neurological deficit were immediately taken up for study without a trial of conservative management. However, patients with primary lumbar canal stenosis, space occupying lesions in the spine, spinal deformities, spinal infections and isolated disc herniations were excluded.

All patients were evaluated for signs and symptoms of degenerative lumbar canal stenosis using the Oswestry Disability Index[11]. All the patients were explained the merits and demerits of surgery. Willing patients were taken up for laminectomy and decompression of the affected nerve roots using medial facetectomy. All the surgeries were performed by a single surgeon. Number of levels of decompression was decided based on MRI diagnosis of spinal canal diameter less than 10mm.

Post operatively patients were regularly followed up at monthly intervals. The ODI score was calculated at the end of 6 months and compared with the baseline score.

RESULTS

A total of 50 patients that met the inclusion criteria were included in the study. The mean age of the patients was 42.9±10.6 years with 50% patients between 40-49 years. 56% participants (28 out of 50) were male and 22 out of 50 (44%) were female. Mean duration of symptoms was 53.9±15.9 months. Fifteen (30%) patients complained of backache without radicular pain while 35 (70%) had backache associated with radiculitis. A 90% patients complained of neurogenic claudication. Neurological deficit was present in 35 cases (70%) Table 1.

Table 1: Demographic data and clinical profile.

Mean age	**42.9±10.6 years**
Male: Female	28:22
Mean duration of backache	53.9±15.9 months
Radiculitis	21 unilateral/ 9 bilateral/ 20 absent
Neurological claudication	Present in 90% cases
ODI score Baseline	71.2±6.4
ODI score at 6 months follow up	21±15.6

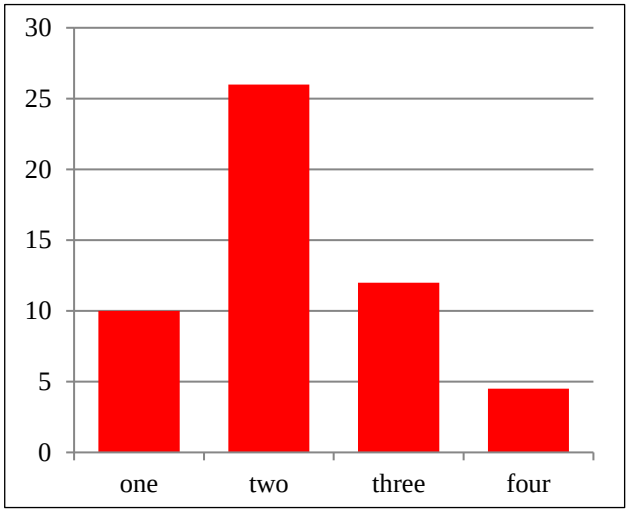

Figure 1: Number of levels involved based on MRI.

As shown in Figure 1, 26 (52%) of the patients had spinal canal diameter of less than 10mm at 2 levels while 10 (20%) had a single level involvement based on MRI. Three and four level involvement were present in 12 (24%) and 2 (4%) respectively.

Average baseline ODI score for the 50 patients that were taken up for study was 71.2±6.4. On follow up of 6 months, the mean ODI score was 21±15.6. The improvement in the ODI score was statistically significant (t-19.024). The change in ODI score was 50.2 at 6 months.

DISCUSSION

Degenerative spinal canal stenosis is a progressive disorder. A study on cadavers suggests that degeneration of the intervertebral disc leads to decrease in disc height associated with bulging of the disk and buckling of the ligamentum flavum. It also leads to hypermobility of facet joints. Eventually, hypertrophy of the facets occurs along with degeneration and hypertrophy of the ligamentum flavum. Fibrosis of ligamentum flavum is the main cause of hypertrophy. This is occurs due to mechanical stress, especially along the dorsal aspect.

Protrusion of the degenerated disc, hypertrophy of the facet joint capsule, osteophyte formation, infolding of the yellow ligament leads to reduction in volume of the spinal canal. Central canal stenosis leads to neurological claudication while foraminal stenosis leads to radicular pain. Facet arthritis is the most common cause of foraminal stenosis[3,4,12]

In our study, the mean age of the patients was 42.9±10.6 years including 28 males and 22 females. Similar age and sex distribution of study subjects was reported by Anjarwalla et al, who studied outcome of decompression in a total of 84 subjects (41 female and 43 male, with a mean age of 52.8±14.0 years).[13]

In their study of 726 patients with degenerative spinal stenosis, Crawford et al reported a mean age of 65.6 years, and 407 (56%) patients were male.[14] Nath et al, also reported an average age of 45.1 years (range 17-74 years) in their study of 32 cases including were 22 males and 10 females.[15] Slight male preponderance may have been due to the involvement of males in heavy work.

In our study, 26 (52%) of the patients underwent laminectomy at 2 levels, 10 (20%) at single level and 12 (24%) at 3 levels. Crawford et al, in their study reported that out of 726 patients, 294 (40%) underwent 2-level decompression, 208 (29%) underwent 3-level decompression, 177 (24%) underwent 1-level decompression.[14]

Anjarwalla et al, reported 77% of subjects underwent decompression two or more levels in their study. In the present study, 80% patients needed decompression at 2 or more levels.[13] However, in cohort study by Weinstein et al, 34.81% patients underwent laminectomy at 3 or more levels which was higher than the present study.[16]

In the present study, we found statistically significant improvement in ODI score at a follow up of 6 months. Average baseline ODI score for the 50 patients that were taken up for study was 71.2±6.4. On follow up of 6 months, the mean ODI score was 21±15.6. The improvement in the ODI score was statistically significant (t-19.024). The change in ODI score was 50.2 at 6 months.

In a follow up of 6 months, Weinstein et al reported ODI score of 20.1 with a mean improvement of 23.9 in the ODI score.[16] Crawford et al, reported significant improvements from baseline ODI score of 49.11 to 27.20 at 3 months and 26.38 at 1 year post operatively.[14] Anjarwalla et al, observed no significant difference between ODI scores at baseline and at 6 weeks. However, at 1 year, they observed statistically significant improvement which was maintained at 5 years.[13] Nath et al, report excellent to good outcome in 64% cases at 1 year follow up.

CONCLUSION

Operative treatment in patients of degenerative lumbar canal stenosis yields excellent functional results as observed based on the ODI system. However, proper it is imperative that proper case selection is done in order to prevent complications.

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