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Surgery versus non-surgical treatment for lumbar spinal stenosis: A comparative study

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Abstract

Background: Surgery for lumbar spinal stenosis remains an option for patients with persistent and severe symptoms that include both back and leg pain. In contrast, in nonsurgical treatment surgeons were encouraged to recommend active physical therapy (PT), education or counseling with home exercise instruction, and nonsteroidal anti-inflammatory medication. The present study was conducted to compare surgery versus non surgical treatment for lumbar spinal stenosis.

Material and Methods: The present study was conducted to compare surgery versus non surgical treatment for lumbar spinal stenosis. Patients were randomly divided into two treatment groups; 1) surgical decompression or 2) physical therapy. The study was then fully explained to the subjects, after which they would be randomly assigned to have surgery or attend physical therapy. The Group I was patients with surgical treatment and Group II was patients with physical therapy. The primary outcome for the study was the Physical Function score on the Medical Outcomes Survey Short Form 36 (SF-36) at baseline, 10 weeks, 26 weeks. All analyses were conducted in SAS version 9.3.

Results: In the present study total sample size was 120 subjects per group, with a 50% split by gender (60 subjects per group). The mean age of surgery group was 64.8 and of physical therapy were 68.9. Maximum patients in both groups had no prior back surgeries for the same spinal segment. Baseline Mean changes in physical function for the surgery and PT groups were 25.9 and 28.8 respectively. 10 weeks Mean changes in physical function for the surgery and PT groups were 43.7 and 40.4 respectively. 26 weeks Mean changes in physical function for the surgery and PT groups were 48.1 and 46.5 respectively. Results showed that participants in both groups began to improve at 10 weeks; continued to improve through 26 weeks.

Conclusion: The present study concluded that patients began to show improvement at the 10 week mark, continued to improve through 26 weeks of the study.

Keywords: Lumbar spinal stenosis, lumbar spine, laminectomy, nonsteroidal anti-inflammatory medication

Introduction

Lumbar spinal stenosis (LSS) is an anatomical impairment characterized by narrowing of the spinal canal or nerve root foramen [1]. Lumbar spinal stenosis (LSS) is “a clinical syndrome of buttock or lower extremity pain, which may occur with or without back pain, associated with diminished space available for the neural and vascular elements in the lumbar spine” [2]. LSS can be classified as congenital (developmental), acquired or both [3]. Most cases of LSS occur as acquired degenerative stenosis, resulting from aging of the spine or following surgery or infection [4, 5]. When symptomatic, LSS causes pain, weakness in the lower back and buttocks and thighs and claudicating pain [1]. Possible surgical procedures for spinal stenosis include laminectomy, fusion, minimally invasive implants, spinal devices and prostheses [6]. Conservative treatments include exercise, manipulation, mobilisation, physical therapy, drugs, acupuncture, bracing, education and cognitive-behavioural treatments [7]. Non-surgical interventions are almost always initially recommended in the treatment of patients with LSS [8], but surgery is generally considered the gold standard [9]. In SPORT (Spine Patient Outcomes Research Trial), the largest randomized, controlled trial (RCT) comparing surgical and nonsurgical treatment of LSS, the surgical group had a standard posterior decompressive laminectomy. In contrast, the nonsurgical group received usual care in which surgeons were encouraged to recommend active physical therapy (PT), education or counseling with home

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exercise instruction, and nonsteroidal anti-inflammatory medication as initial management strategies, but participants could receive any additional conservative treatments deemed appropriate by the surgeon [10]. The present study was conducted to compare surgery versus non surgical treatment for lumbar spinal stenosis.

Material and Methods

The present study was conducted to compare surgery versus non surgical treatment for lumbar spinal stenosis. Patients were randomly divided into two treatment groups; 1) surgical decompression or 2) physical therapy. The patients were enrolled with a diagnosis of LSS identified by either CT scan or MRI scan. The sample size was 120 subjects per group, with a 50% split by gender (60 subjects per group). Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and written informed consent was obtained from the patients. Patients who had presence of neurogenic claudication (e.g., self-reported inability to walk greater than ¼ mile due to lower extremity pain and/or cramping); agreeing to be randomly assigned to either surgery or to attend a specified physical therapy clinic for twice weekly exercise sessions; and no previous surgery for LSS at the level being considered for decompression were included in the study. Patients who were less than 50 years of age; had signs of serious dementia; diagnosis of severe vascular disease or recent history of myocardial infarction; concomitant spondylolisthesis requiring fusion (defined as > 5mm of slippage); compression fractures at the level being considered for decompression; or a diagnosis of metastatic

cancer were excluded in the study. The study was then fully explained to the subjects, after which they would be randomly assigned to have surgery or attend physical therapy. The Group I was patients with surgical treatment and Group II was patients with physical therapy. This examination scheme was designed to identify impairments in lower extremity strength and flexibility to be addressed during treatment. Treatment fidelity was assessed by the investigators. Physical therapy was prescribed for 6 weeks, with a frequency of 2 visits per week, and delivered by licensed Physical Therapists. The primary outcome for the study was the Physical Function score on the Medical Outcomes Survey Short Form 36 (SF-36)¹¹ at baseline, 10 weeks, 26 weeks. All analyses were conducted in SAS version 9.3.

Results

In the present study total sample size was 120 subjects per group, with a 50% split by gender (60 subjects per group). The mean age of surgery group was 64.8 and of physical therapy were 68.9. Maximum patients in both groups had no prior back surgeries for the same spinal segment. Baseline Mean changes in physical function for the surgery and PT groups were 25.9 and 28.8 respectively. 10 weeks Mean changes in physical function for the surgery and PT groups were 43.7 and 40.4 respectively. 26 weeks Mean changes in physical function for the surgery and PT groups were 48.1 and 46.5 respectively. Results showed that participants in both groups began to improve at 10 weeks; continued to improve through 26 weeks.

Table 1: Demographic data

Variable	Surgery (N=60) %	Physical therapy(N=60) %
Mean Age(yrs)	64.8	68.9
Prior back surgeries not for the same spinal segment		
0	55(91.66%)	47(78.33%)
1	4(6.66%)	8(13.33%)
>1	1(1.66%)	5(8.33%)

Table 2: Changes in Outcome over Time in the Surgery and Physical therapy Groups

SF-36 physical function	Baseline mean score	10 week mean score	26 week mean score
Surgery(n=60)	25.9	43.7	48.1
Physical therapy(n=60)	28.8	40.4	46.5

Discussion

Lumbar spinal stenosis (LSS) has a significant impact on mobility, functioning and quality of life. LSS is one of the most commonly treated spinal disorders in older adults, and its prevalence will continue to rise with the aging population [9].

In the present study total sample size was 120 subjects per group, with a 50% split by gender (60 subjects per group). The mean age of surgery group was 64.8 and of physical therapy were 68.9. Maximum patients in both groups had no prior back surgeries for the same spinal segment. Baseline Mean changes in physical function for the surgery and PT groups were 25.9 and 28.8 respectively. 10 weeks Mean changes in physical function for the surgery and PT groups were 43.7 and 40.4 respectively. 26 weeks Mean changes in physical function for the surgery and PT groups were 48.1 and 46.5 respectively. Results showed that participants in both groups began to improve at 10 weeks; continued to improve through 26 weeks.

The SF-36 functional score of the patients at baseline in the

Maine Lumbar Spine Study [12, 13] for the surgery and PT groups was 34.8 and 35.0, respectively.

In the study by Malmivaara *et al.* [14, 15] Oswestry Disability Index for the surgery and PT groups was 42.4 and 35.0, respectively.

Low-quality evidence from studies shows that decompression and conservative treatment have similar results for disability (Oswestry Disability Index (ODI)) at three, six and 12 months [16, 17], and at 24 months, one study reported better results for surgical decompression [17].

Another single study found low-quality evidence favouring an interspinous device with surgical decompression over conservative treatment at six weeks, six months and one year of follow-up [18].

The treatment effects in these studies of spinal stenosis were larger than those in the observational study of patients with inter-vertebral disk herniation because of strong improvements in the nonsurgical group of patients with intervertebral disk herniation that were not seen in either stenosis group [19-21].

Conclusion

The present study concluded that patients began to show improvement at the 10 week mark, continued to improve through 26 weeks of the study.

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