Functional Outcome of Patients Operated For Lumbar Canal Stenosis without Fusion Retrospective study

Prof Dr. Bahaa Kornah, Prof Dr. Mohammed Negm, Dr. Bahaa Khairy

Orthopaedic Surgery Department, Faculty of Medicine, Al-Azhar University, Egypt
bahaamaklad@gmail.com

Abstract: Study Design. A retrospective observational study of patients undergoing surgery for degenerative lumbar spinal stenosis. **Objective.** To determine whether the functional outcome of lumbar decompression without fusion using Oswestry Disability Index. **Summary of Background Data** Degenerative lumbar canal stenosis is the most common indication for spinal surgery in the mature patient population. Decompressive surgery is suggested to improve outcomes in patients with moderate to severe symptoms of lumbar canal stenosis. Oswestry Disability Index (ODI) is widely accepted quantitative index in determining functional status of lumbar spinal stenosis patients. **Method.** In our study, we assess functional outcome of thirty patients operated for degenerative lumbar canal stenosis whose underwent decompressive surgery without fusion in the period from May 2015 to July 2016 in Azhar university hospitals with minimum six month follow up and compare between pre-operative (ODI) and post-operative ODI. **Result.** The mean ODI to all patients pre-operative was 62% which declined post-operative to 28.5. **Conclusion.** Patients can expect a clinically meaningful improvement after lumbar decompression for symptomatic lumbar canal stenosis. Our patient population confirms significant positive development in quality of life in the short-term follow-ups. Simple open decompression without fusion in patients with lumbar canal stenosis verifies excellent outcome in patient's satisfaction in comparison with pre-operative state.
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Introduction

Degenerative lumbar canal stenosis is characterized by a compression of the neural elements, resulting in radicular pain and neurogenic claudication, weakness, numbness, tingling and pain in the lower back or buttocks.

These complaints not only cause a great deal of discomfort, but also marked restrictions in mobility and function. Together with the inevitable decline in musculoskeletal function. Lurie and Tomkins-Lane, [1]

This results in impairment of the patient's ability to perform activities of daily living and a threat to his/her independence.

Surgery is indicated in patients with clinical and radiographic evidence of spinal stenosis who have intractable pain, altered quality of life, or substantially diminished functional capacity and have either failed nonsurgical treatment or are not candidates for nonsurgical treatment. Inoue, Miyagi, and Takaso [2] Issack et al. [3]

Main treatment goals in surgical decompression are improvement in pain, functional status, and quality of life by decompress the spinal canal and dural sac from degenerative bony and ligamentous overgrowth or prolapsed disc.

Decompressive surgery is suggested to improve outcomes in patients with moderate to severe symptoms of lumbar canal stenosis. G. Inoue, Miyagi, and Takaso [2].

The goals of this retrospective studywere to evaluate surgical results for degenerativelumbar spinal stenosis at standard intervals aftersurgery in terms of symptom severity rated by the patient.

Patients and Method

In our study, we assess functional outcome of thirty patients operated for degenerative lumbar canal stenosis whose underwent decompressive surgery without fusion in the period from May 2015 to July 2016 in Azhar university hospitals with minimum six month follow up.

The functional outcome evaluated by using Oswestry Low Back Pain Questionnaire. Fairbank and Pynsent [4] by comparing Oswestry Disability Index (ODI) preoperative, and three to six month postoperative. Fairbank and Pynsent [4] The questionnaire translated and validated by Validation of an Arabic version of the Oswestry index in Saudi Arabia. Algarni et al. [5].

The inclusion criteria for the study:

- Age over 30 years.
- Clinical symptoms: back pain radiation to lower limbs or buttocks; fatigue or loss of sensation in the lower limbs aggravated by walking.
- Patients with neurogenic claudication and radiological findings of LSS and completed 6 months follow up assessment.

- Clinical signs and symptoms corresponding to segmental radiographic level of stenosis.
- Duration of symptoms and signs for more than 6 months to accurately assess the outcome.
- Imaging techniques: spinal canal narrowing, the sagittal diameter of the dural sac being less than 10 mm2.
- Patient operated for degenerative lumbar canal stenosis with posterior decompression without fusion.
- Completion of questionnaires.
- Good understanding of spoken Arabic.

The exclusion criteria for the study:

- Spondylolisthesis.
- Spinal stenosis not caused by degeneration.
- Previous back surgery because of spinal stenosis or instability.
- Another specific spinal disorder, e.g., ankylosing spondylitis, neoplasm, or metabolic diseases.
- Intermittent claudication due to atherosclerosis.
- Severe osteoarthrosis or arthritis causing dysfunction of the lower limbs.
- Neurologic disease causing impaired function of the lower limbs, including diabetic neuropathy.
- Psychiatric disorders.

Results

In our study, **30** we observed patients **18 (60%)** were males and **12 (40%)** were females. The average age was **53.87** years ranging from **31 -73** years.

Most of cases i.e. **20 (66.6%)** cases had low back pain and sciatica started simultaneously. While i.e. **10 (33.3%)** patient had only sciatica as only symptom, included two patients were presented by paraparesis.

Out of all patients, **26 (86%)** cases had bilateral sciatica while remaining had one side sciatica. Low back ache and radicular pain were most common symptoms of patients with degenerative lumbar canal stenosis.

The entire patient complaining of neurogenic claudication pain with average claudication distance range **299** meters with range from **5** to **1000** meter.

Mean duration of symptoms was **7** months with range from **40** days to **18** months while radicular pain was present on average for **2.5** months.

All cases in our study were diagnosed as degenerative lumbar canal stenosis according to our inclusion criteria, on MRI, most of cases were stenotic lumbar canal either discogenic or non discogenic with one or multiple level of stenosis i.e. **10 (33%)** patients, had one level stenosis **6 (20%)** patients had two level stenosis, **12 (40%)** patient had three level stenosis, and **2 (7%)** patient had four level stenosis figure 12.

Average duration of surgery was approximately **75** minutes with average blood loss of **150** mL ranging from **100** mL to **250** ml. Average duration of hospital stay for patients was 2days postoperatively. We informed about complications in **4 (13%)** cases had superficial wound infection which was treated well with debridement and intravenous antibiotics. And **1** case Dural tear which managed conservatively.

Regarding study result correlation with age of patients selected in the study. The age ranging from **31** years to **73** years. And there is no significant difference in the outcome regarding the age distribution of age of the patients.

Regarding study result correlation with number of stenotic levels. In our study, we observe 30 patients which have stenotic lumbar canal ranging from one level stenosis to four level stenosis there is no significant deference in the functional outcome

According to the which is quantitative scale to measure a patient's permanent functional disability patients by asking multiple questions which mentioned before.

According to the retrospective nature of our study we compared between pre-operative and post-operative (ODI) according to the questionnaire which submitted by the patient either by telephone or mail, which spent six month or more post-operative.

The detailed result is collected and mentioned in table.

We found significant improvement in functional outcome according to (ODI) post-operative in most patient as described later.

But we found deterioration of symptoms in **2** patients which show increase the ODI post-operative may be due to more predominant back pain than leg pain in pre-operative presentation.

The mean ODI to all patients pre-operative was 62% which declined post-operative to 28.5 figure.

Discussion

Degenerative LSS is the most common diagnosis leading to lumbar spinal surgery in elderly patients.

Despite the widespread surgical treatment for LSS, the accurate results remain unclear.

Several authors have reported good to excellent outcomes for most patients without substantial deterioration over time. Lurie [6] Jolles et al [7].

On the other hand, other authors have reported that outcomes are not so favorable and that patients deteriorate over time. Katz et al. [8].

A possible explanation for these contradictory results is differences in the study design, including different study methodologies, inclusion and exclusion criteria for selecting patients, outcome measures, follow-up times, and outcome rating criteria. Another explanation could be that there were differences in the

baseline characteristics of the patients, such as age, gender, comorbidity, and psychologic status. Turner et al [9].

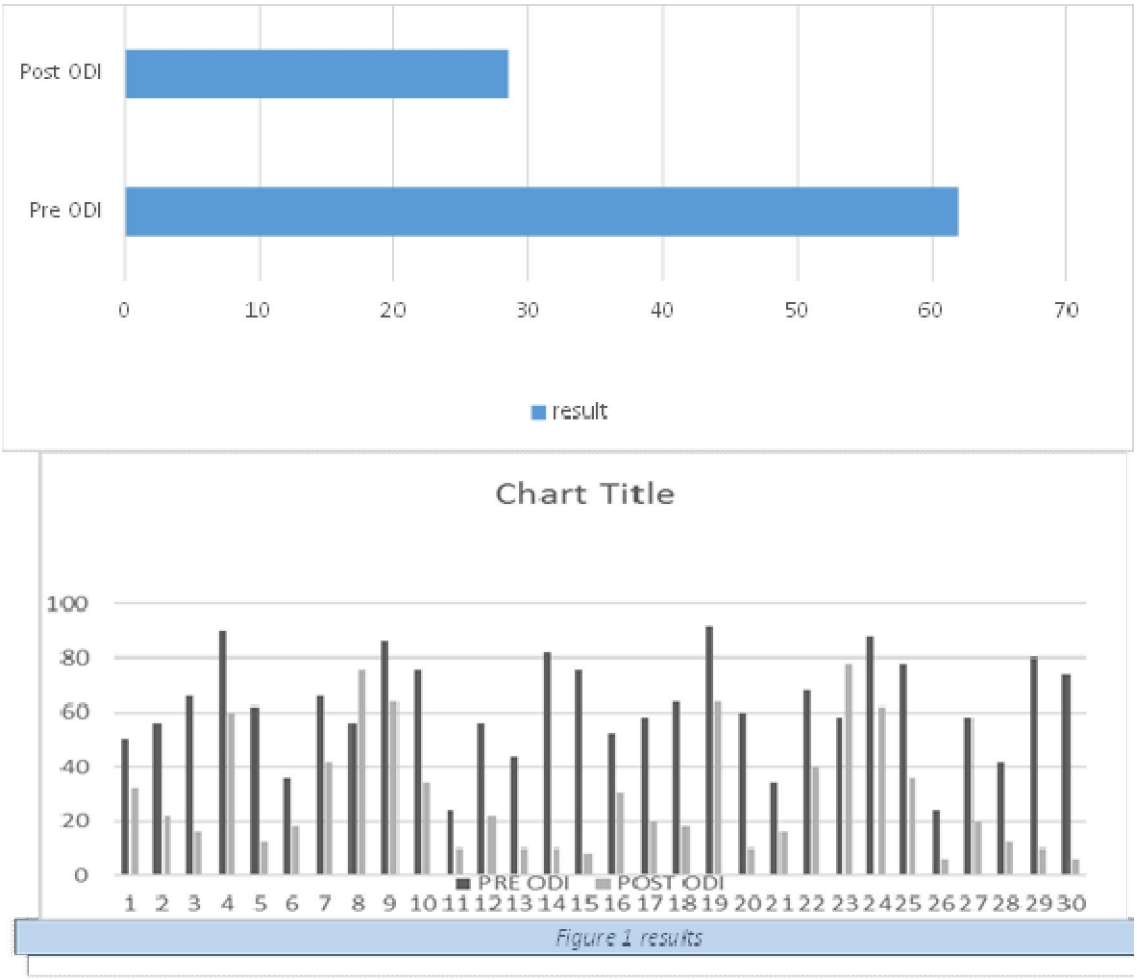

Figure 1 results

In this study, which is retrospective in nature, as a result of debates in literature about is fusion after decompression surgery in cases of lumbar canal stenosis affecting the functional outcome of the patient or not.

All the patient whose had signs of instability pre-operative or have any previous spine surgery or have other spine pathology rather than lumbar canal stenosis had been excluded.

We not differentiate between patients who has single or multiple level stenosis and they are randomly selected also.

Questionnaire filled by the patients after having their consent.

functional outcome is only estimated the of the patients according to which asses the functional outcome which is widely accepted index in determining the functional outcome which directly affect the patient's life style and work disability.

In the results, we found that there is significant improvement in the functional outcome after six month of operation.

A standard open posterior lumbar laminotomy were used at the affected level or levels without fusion. The decompression of the lateral recesses and foramina was performed when necessary.

And there is no difference in the functional outcome regarding the number of stenotic level on condition of, avoid massive decompression or remove more than the medial third one third of the facet joint as mentioned in literatures.

Good selection of patients has very significant impact in the outcome of this procedure, so patients who complaining of predominant lower limb

symptoms with mild to moderate back pain will have the best outcome.

Although in very old patients or patients with bad medical condition this decompression without fusion can be useful to relieve lower limb symptoms or neurological deficit. As it is relative short time operation, less blood loss and less expensive.

Factors associated with poorer outcomes have included questionable radiographic confirmation of stenosis, female sex, long history of complain, and psychic patients.

Other studies showed similar results Ragab et al [10] Katz et al. [11] reported a satisfaction rate of 75% with a mean age of 69 years. Furthermore, Sanderson and Wood [12] reported excellent outcome in 64% of patients with a mean age of 65 years. In comparison, our study included patients with a mean age of 53 years of age. In 2 other studies with similar mean ages Galiano [13] and Shabat [14] reported a satisfaction rate of 65% and 76%. Several studies stated that comorbidity is associated with worse outcome. Airaksinen [15] JKatz [16].

The majority of our patients showed in the follow-up period of 6 and 12 months clinically significant improvement calculated by the ODI.

A limitation of our study is the relatively small number of operated patients (30 patients) and relatively short follow up period.

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