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Original Article

The relationship between preoperative predictive factors for clinical outcome in patients operated for lumbar spinal stenosis by decompressive laminectomy

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ABSTRACT

Background: Our hypothesis was that by identifying certain preoperative predictive factors, we could favorably impact clinical outcomes in patients undergoing decompressive surgery for lumbar spinal stenosis (LSS).

Methods: In this retrospective study, there were 65 patients (2016–2018) with symptomatic LSS who underwent decompressive laminectomy without fusion. Their clinical outcomes were assessed utilizing the Oswestry Disability Index (ODI). Multiple preoperative variables were studied to determine which ones would help predict improved outcomes: gender, age, body mass index (BMI), general/neurological examination, smoking, and drug therapies (anxiolytics and/or antidepressants).

Results: All patients demonstrated statistically significant improvement on the ODI. Multivariate analysis revealed that those with higher preoperative BMI had significantly lower ODI on 1-year follow-up examinations, reflecting poorer outcomes. Postoperatively, 44 patients (67%) exhibited lower utilization of anxiolytic medications, 52 patients (80%) showed reduced use of antidepressant drugs, and pain medications utilization was reduced in 33 patients (50%).

Conclusion: Decompressive laminectomy without fusion effectively managed LSS. It reduced patients' use of pain, anxiety, and antidepressant medications. In addition, we found that increased preoperative BMIs contributed to poorer postoperative outcomes (e.g., ODI values).

Keywords: Body mass index, Decompressive laminectomy, Lumbar spinal stenosis, Obesity in spine surgery, Oswestry Disability Index scale

INTRODUCTION

Lumbar spinal stenosis (LSS) can be effectively treated with decompressive laminectomy without fusion. Here, we asked what preoperative risk factors would contribute to poorer postoperative outcomes. Notably, the literature had previously shown that elevated preoperative body mass index (BMI) and a history of smoking both contributed to poorer outcomes following decompressive LSS surgery.[3,7,8]

Table 1: Clinical characteristics of patients.

	Patients (*n*=65)
Age (years)	71.7 (7.0)
Male sex	31 (47.7)
Body mass index (kg/m^2)	27.0 (3.8)
Smoking	18 (27.7)
Preoperative ODI	49.9 (13.3)

Data are mean (standard deviation) for continuous variables and *n* (%) for categorical variables. ODI: Oswestry Disability Index

Table 2: Multiple linear regression model predicting the change in disability during follow-up.

Variable	β-coefficient	95% CI	*P*-value
Age	−0.02	−0.32–0.29	0.913
Sex	−4.12	−8.5–0.29	0.066
Body mass index	−0.98	−1.55–−0.41	0.001
Smoking	−0.26	−5.31–4.80	0.920
Preoperative ODI	0.19	−0.02–0.35	0.030

β-coefficients with their 95% CIs and corresponding *P* values from multiple linear regression model are shown. CI: Confidence interval, ODI: Oswestry Disability Index

MATERIALS AND METHODS

This study included 65 patients averaging 70.4 years of age with LSS undergoing decompressive laminectomy without fusion. There were 36 males (56%) and 29 females (44%). All patients failed conservative treatment for at least 6 months before undergoing LSS surgery. Those with a diagnosis of spondylolisthesis, spinal tumors, infections, or prior surgery were excluded from this analysis. The following preoperative parameters were assessed to determine their impact on surgical outcomes: gender, age, BMI, smoking history, use of pain/antidepressant/anxiolytic medications, and preoperative neurological deficit/disability level. The latter was estimated utilizing the Oswestry Disability Index (ODI) score, evaluated preoperatively and 1, 6, and 12 months postoperatively (follow-up) [Table 1].

Statistical analysis

Values were presented as mean ± standard deviation for continuous variables and as the number (percentage) of subjects for categorical variables. The outcome measure was the change in disability estimated as the difference between the ODI values obtained at 12 and 1 month after surgery. The associations between the disability change and baseline variables were assessed using a linear regression model and included the analysis of age, sex, BMI, smoking status, and preoperative ODI. Results were considered significant for $P < 0.05$ (two sided). Data analysis was performed using STATA/IC 13.1 statistical package (StataCorp LP, Texas, USA).

RESULTS

There was a statistically significant improvement in ODI values for all patients. The multivariate analysis revealed that patients with high preoperative BMI had significantly lesser postoperative ODI at 1 postoperative year (e.g., poor outcomes). After surgery, 44 patients (67%) reduced the use of anxiolytic drugs, 52 patients (80%) used fewer antidepressants, and 33 patients (50%) took fewer pain medications. Other factors such as age and gender were not statistically significant [Table 2].

DISCUSSION

Some authors showed equivalent clinical outcomes for those with elevated preoperative BMI and a history of smoking; alternatively, they attributed poorer postoperative results to increased perioperative blood loss and more chronic preoperative lumbar pain contributing to longer hospital length of stay.[6,9]

Other literature documented that both obesity and smoking contributed to greater perioperative risks/complications of laminectomy for LSS.[1,2,4,5,10,11] Here, we found that greater preoperative BMI alone contributed to poorer postoperative outcomes following lumbar laminectomy without fusion for LSS, largely attributed to protracted postoperative bed rest, and more difficulty with rehabilitation. The authors, therefore, concluded that preoperative diet and exercise programs, by reducing preoperative BMI, would enhance future recovery from laminectomy for LSS.

CONCLUSION

Decompressive laminectomy to treat lumbar spinal stenosis was effective to treat pain and disability. In this prospective study baseline elevated BMI was statistically associated with postoperative poor results in terms of ODI value.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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