

Purpose: A recent review reported that, after lumbar decompression surgery, 1.6-32.0% of patients develop postoperative symptomatic spondylolisthesis and may therefore be indicated for lumbar fusion surgery. The latter can be more challenging due to the altered anatomy and scar tissue. It remains unclear why some patients develop a postoperative symptomatic spondylolisthesis. This study explores the association between key demographic, biological and radiological factors and postoperative symptomatic spondylolisthesis after lumbar decompression.

Methods:

This retrospective cohort study included patients who had undergone lumbar decompression surgery between January 2014 and December 2016 at one of two Spine Centres in the Netherlands or Switzerland and had a follow-up of at least two years. Patient characteristics, details of the surgical procedure and recurrent neurological complaints were retrieved from patient files. Preoperative MRI-scans and X-rays of the lumbar spine were evaluated for multiple morphological characteristics. Postoperative spondylolisthesis was evaluated on postoperative MRI-scans. For patient-basis outcomes, patients with and without postoperative symptomatic spondylolisthesis were compared. For surgical level-basis outcomes, surgical levels that did or did not develop postoperative spondylolisthesis, were compared. Univariable and multivariable logistic regression analyses were used to identify statistical predictors of postoperative symptomatic spondylolisthesis.

Results:

716 patients with 1094 surgical levels were included in the analyses. ICCs of X-ray and MRI variables ranged between 0.67-0.99. In total, 91 of 716 included patients developed postoperative symptomatic spondylolisthesis (12.7%). Multivariable regression analyses of patient-basis outcomes showed that a higher risk of postoperative symptomatic spondylolisthesis for females and Rheumatoid Arthritis. A lower risk was associated with smoking and a higher BMI. Multivariable regression analyses of surgical level-basis outcomes showed that a higher risk of postoperative symptomatic spondylolisthesis was associated with levels with preoperative spondylolisthesis and increased cross-sectional area (CSA) of M. psoas.

Conclusion:

Being female and having Rheumatoid Arthritis was associated with a higher risk of postoperative symptomatic spondylolisthesis, while having a higher BMI and smoking was associated with a lower risk. When looking at factors related to postoperative symptomatic spondylolisthesis at the surgical level, preoperative spondylolisthesis and increased CSA of M. psoas showed a significant association. The identified associations may be useful for shared-decision making, when deciding for decompression surgery versus lumbar fusion surgery in patients with lumbar spinal stenosis. Future research will focus on a prediction model for a clearer overview of the influence of risk factors on postoperative symptomatic spondylolisthesis.