Grade 1 lumbar spondylolisthesis outcome

Prior studies have revealed that a body mass index (BMI) ≥ 30 is associated with worse outcomes following surgical intervention in grade 1 lumbar spondylolisthesis. Using a machine learning approach, a study aimed to leverage the prospective Quality Outcomes Database (QOD) to identify a BMI threshold for patients undergoing surgical intervention for grade 1 lumbar spondylolisthesis and thus reliably identify optimal surgical candidates among obese patients.

Patients with grade 1 lumbar spondylolisthesis and preoperative BMI ≥ 30 from the prospectively collected QOD lumbar spondylolisthesis module were included in this study. A 12-month composite outcome was generated by performing principal components analysis and k-means clustering on four validated measures of surgical outcomes in patients with spondylolisthesis. Random forests were generated to determine the most important preoperative patient characteristics in predicting the composite outcome. Recursive partitioning was used to extract a BMI threshold associated with optimal outcomes.

The average BMI was 35.7, with 282 (46.4%) of the 608 patients from the QOD data set having a BMI ≥ 30. Principal components analysis revealed that the first principal component accounted for 99.2% of the variance in the four outcome measures. Two clusters were identified corresponding to patients with suboptimal outcomes (severe back pain, increased disability, impaired quality of life, and low satisfaction) and to those with optimal outcomes. Recursive partitioning established a BMI threshold of 37.5 after pruning via cross-validation.

In a multicenter study, Agarwal et al. found that a BMI ≤ 37.5 was associated with improved patient outcomes following surgical intervention. These findings may help augment predictive analytics to deliver precision medicine and improve prehabilitation strategies [1].

1)
Agarwal N, Aabedi AA, Chan AK, Letchuman V, Shabani S, Bisson EF, Bydon M, Glassman SD, Foley KT, Shaffrey CI, Potts EA, Shaffrey ME, Coric D, Knightly JJ, Park P, Wang MY, Fu KM, Slotkin JR, Asher AL, Virk MS, Haid RW, Chou D, Mummaneni PV. Leveraging machine learning to ascertain the implications of preoperative body mass index on surgical outcomes for 282 patients with preoperative obesity and lumbar spondylolisthesis in the Quality Outcomes Database. J Neurosurg Spine. 2022 Oct 7:1-10. doi: 10.3171/2022.8.SPINE22365. Epub ahead of print. PMID: 36208428.