What Preoperative Factors are Associated with Achieving a Clinically Meaningful Improvement and Satisfaction after Lumbar Fusion for Degenerative Spondylolisthesis? A Multivariate Analysis of 997 Patients

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INTRODUCTION: Proper patient selection is key to ensuring good surgical results in spine surgery. Identifying preoperative characteristics that predict postoperative outcomes may guide surgical decision-making and facilitate preoperative counseling. This study aimed to identify characteristics associated with clinically meaningful improvement, patient satisfaction, and expectation fulfillment in patients undergoing transforaminal lumbar interbody fusion (TLIF) for degenerative spondylolisthesis.

METHODS: Patients who underwent a primary single-level TLIF for degenerative spondylolisthesis between 2006 and 2015 were identified from our institutional spine registry. Demographic and perioperative characteristics were recorded. Patient-reported outcomes (PRO) such as the Oswestry Disability Index (ODI), 36-Item Short-Form Physical Component Score (SF-36 PCS), Mental Component Score (SF-36 MCS), Visual Analogue Scale (VAS) back pain, and VAS leg pain were collected preoperatively and at 2 years postoperatively. Patients also completed the North American Spine Society (NASS) questionnaire for patient satisfaction and expectation fulfillment. Multivariate logistic regression was used to identify preoperative characteristics associated with achieving the minimal clinically important difference (MCID) for each PRO, patient satisfaction, and expectation fulfillment using a forward stepwise inclusion algorithm.

RESULTS: In total, 997 patients were included (Table 1). Significant improvements in VAS Back, VAS Leg, ODI, SF-36 PCS, and SF-36 MCS were observed (Table 2). The majority of patients achieved MCID, satisfaction, and expectation fulfillment (Table 3). After adjusting for confounding variables, multivariate analyses showed that increasing age and better preoperative ODI were associated with achieving MCID for VAS Back; increasing age and better preoperative VAS Back were associated with achieving MCID for VAS Leg; lower BMI and better preoperative ODI were associated with achieving MCID for SF-36 PCS (Table 4). Better preoperative SF-36 MCS was associated with MCID attainment for ODI, satisfaction, and expectation fulfillment. Other preoperative variables such as sex, diabetes, arthritis, comorbidity burden, and surgical approach were not associated with postoperative outcomes.

DISCUSSION AND CONCLUSION: Older patients were more likely to experience a clinically significant improvement in back or leg pain after lumbar fusion for degenerative spondylolisthesis, while patients with less disability were more likely to experience an improvement in back pain and quality of life. In particular, a patient’s preoperative mental health was independently associated with multiple outcomes, such as clinically meaningful improvement in functional disability, postoperative satisfaction, and expectation fulfillment.