Pre-Operative Modified Zung Depression Index Scores Are Not Predictive of Worse Post-Operative Functional Outcome in Adult Spinal Deformity Patients

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INTRODUCTION:
Pre-operative mental health status is a known risk factor for worse post-operative outcomes after lumbar spine surgery. However, few studies have investigated the effect pre-operative mental health has on patients after surgery for adult spinal deformity (ASD). We investigated the effects of pre-operative depression, as measured by the Modified Zung Depression Index (MZDI), on post-operative Oswestry Disability Index (ODI) scores after corrective surgical treatment for ASD.
METHODS:
An institutional review board approved database consisting of a consecutive series of patients with ASD from 2014 to 2019 treated at a single academic institution was used for this study. All patients were 18 years or older, underwent long-segmental spinal fusion from the thoracic spine to the pelvis, and had at least 6 months of follow-up. MZDI scores were measured at patient's first pre-operative visit; scores $\geq$ 33 were categorized as depressed. ODI scores were measured at both the first pre-operative visit and final post-operative visit. Age, history of spine surgery, Charlson comorbidity index (CCI) score, alcohol consumption, tobacco consumption, history of mental health disorder, history of anti-depressant use, body mass index, and pre-operative pain visual analog scale score were collected. Pre-operative cobb angle, upper instrumented vertebrae (UIV) tilt angle, thoracic kyphosis, lumbar lordosis, sagittal vertical axis, pelvic incidence, pelvic tilt, T1 sagittal tilt, and T1 pelvic angle were measured. Statistical analyses were performed using SPSS 27.0. Comparison of means was conducted using Student's *t*-test. Demographic and radiographic variables with a P-value less than 0.200 on univariate linear regression analysis were included in the multivariate analysis to determine the correlation between MZDI scores and patients' baseline variables and ODI scores. Statistical significance was defined as $P < 0.05$.
RESULTS:
A total of 51 patients were included in this study. The average age was 62.2 years ,33% of patients were male, and 43% of patients were depressed. BMI and pelvic tilt were significantly less in depressed patients, but all other demographic and radiographic variables were not significantly different between groups. Average pre-operative ODI, post-operative ODI, and percent change in ODI for depressed patients was 61 +/- 14, 49 +/- 19, 18 +/- 41; average pre-operative ODI, post-operative ODI, and percent change in ODI for depressed patients was 63 +/- 15, 50 +/- 19, 14 +/- 52. There was no significant difference in pre-operative, post-operative, nor percent change in ODI score between groups. Univariate linear regression revealed BMI Ito be significantly associated with decreased absolute (R = -0.300; P = 0.032) and percent change in post-operative ODI (R = -0.376; P = 0.007). Amongst CCI, history of mental health disorder, history of anti-depressant use, BMI, number of instrumented vertebrae, UIV tilt, and lumbar lordosis, which were included in the multivariate analysis, only BMI was significantly associated with percent change in post-operative ODI (R = -0.023; P = 0.047).
DISCUSSION AND CONCLUSION:
Our study suggests that increased BMI, not MZDI score nor depression status, is a significant risk factor for worse improvement in ODI after long-segment spinal fusion with pelvic fixation in patients with ASD.