## Optimizing Mental Health Conditions Prior to Adult Cervical Deformity Surgery: Does Preoperative Optimization Improve Perioperative Outcomes?

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INTRODUCTION: Previous studies have employed psychological questionnaires across various spine populations to identify the baseline effects of spine region disability on psychological distress. However, there is a paucity of literature specifically addressing the psychological status of patients undergoing cervical spine surgery compared to other spine procedures and regions. This study aims to elucidate the psychological burden among patients undergoing surgical treatment for symptomatic degenerative cervical disease.

METHODS: ACD patients who failed at least three months of conservative treatment were included in this study. Patients with active major depression were excluded. Participants were enrolled prospectively and administered four validated self-report instruments: the Distress and Risk Assessment Method (DRAM), the Fear-Avoidance Beliefs Questionnaire (FABQ), the Pain Catastrophizing Scale (PCS), and the Outcome Expectation Question (OEQ). Patients were randomized using matched pairs into two groups: the Sham group (placebo educational group receiving six sham treatments followed by surgery) and the CBT group (receiving cognitive-behavioral therapy by a licensed professional prior to surgery). Surveys were administered at enrollment. Thresholds were set as follows: DRAM > 17, FABQ > 49/66, and PCS > 30/52. Subjects who did not meet these cutoffs were assigned to the control group. Those exceeding any of the thresholds were randomized into either the Sham or CBT group on a 1:1 basis. Patients who exceeded the psychological distress criteria were assigned to the DRAM observation-only group. Basic demographics and baseline HRQL measures (NDI, EQ-5D, PCS, FABQ) were assessed via descriptive analyses. Logistic regression analyses were conducted to determine if disability was an independent predictor of psychological burden at baseline and to assess improvements in perioperative 90-day outcomes.

RESULTS: 47 patients were enrolled in the study (mean age: 53.6 years, 49% Female, mean BMI: 29.4 kg/m<sup>2</sup>). Baseline scores were as follows: mean PCS 27.4, mean FABQ 40, mean EQ-5D score 9.3, and mean NDI 25.6. Severe scores were observed in 57.1% of patients for FABQ, 40.8% for PCS, and 27.7% for NDI. Patients without preoperative intervention exhibited significantly higher levels of psychological distress compared to the CBT and Sham groups, as measured by FABQ (40 vs. 17.55; p<0.001) and PCS (27.4 vs. 19.25; p<0.001). Higher baseline NDI scores were associated with increased odds of higher PCS scores, independent of the number of levels fused and diagnosis (OR:1.76; p=0.019). This trend was also observed for FABQ scores (OR:1.25; p<0.05). Patients who underwent CBT preoperatively had significantly lower reoperation rates compared to those not optimized (11% vs. 32%, p<0.001). Additionally, optimized patients demonstrated significantly lower FABQ scores (18.2 vs. 40; p<0.001). Optimized patients also had lower rates of DJK (7.4% vs. 18.9%, OR:0.55) and shorter postoperative hospital stays (2.4 days vs. 7.2 days; all p<0.05). Importantly, patients who received preoperative optimization had improved EQ-5D Pain and Anxiety scores compared to those who did not (OR: 1.8; p<0.001).

**DISCUSSION AND CONCLUSION:** 

Discussion: This study highlights the significant impact of preoperative mental health optimization on perioperative outcomes in patients undergoing surgery for degenerative cervical spine disease. Our findings demonstrate that patients with higher baseline psychological distress, as indicated by scores on the DRAM, FABQ, and PCS, experience worse surgical outcomes compared to those who received CBT prior to surgery. The results indicate that preoperative psychological distress is prevalent among patients undergoing cervical spine surgery, with substantial portions of the cohort exhibiting severe scores on the FABQ, PCS, and NDI. This underscores the importance of assessing and addressing mental health conditions in this patient population. Patients in the CBT group showed significant improvements in psychological measures, including FABQ and PCS scores, compared to those in the Sham and control groups. This suggests that targeted mental health interventions can effectively reduce psychological burden. Furthermore, patients who underwent preoperative optimization through CBT had lower reoperation rates, fewer incidences of DJK, shorter hospital stays, and better postoperative pain and anxiety scores. These improvements were statistically significant and clinically relevant, emphasizing the role of mental health optimization in enhancing surgical outcomes. The logistic regression analysis also identified baseline NDI scores as a predictor of increased psychological distress, reinforcing the need for comprehensive preoperative evaluations that include psychological assessments.

Conclusion: The study concludes that preoperative psychiatric intervention significantly improves perioperative outcomes in patients undergoing adult spinal deformity surgery. Patients with untreated psychological distress had worse outcomes, including higher reoperation rates, increased length of stay, and greater postoperative pain and anxiety. In contrast, those who received CBT prior to surgery demonstrated improved psychological and surgical outcomes. These findings underscore the importance of incorporating mental health optimization into the preoperative care of patients with degenerative cervical spine disease. By addressing psychological distress before surgery, healthcare providers can enhance patient outcomes, reduce healthcare costs, and improve overall quality of life for these patients.