Mental Health Patient-Reported Outcomes Predict Reported Physical Function for Tibial Plateau Fractures at Mid-Term Follow Up More Strongly than Injury Characteristics

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INTRODUCTION:

The effect of mental health status is known to affect patient symptom intensity and patient-reported outcomes in orthopaedic trauma populations. The purpose of this study was to assess the relationship between mental health patient-reported outcomes (PROMs) on physical function PROMs at mid-term follow up in operatively treated tibial plateau fractures.

METHODS:

Operatively treated tibial plateau fracture patients were identified at a single Level-1 trauma center (2016-2020). Patients were contacted to complete PROMIS Physical Function (PROMIS-PF), PROMIS-29, and Knee Injury and Osteoarthritis Outcome Score (KOOS) questionnaires. PROMIS Anxiety (ANX), depression (DEP), and overall mental health (MH29). T-scores scores were derived from PROMIS-29 data. MH29 is a summary score that incorporates several PROMIS domains including pain, fatigue, social activities, emotional distress, and sleep disturbance into a single score. Multivariate models were created to determine predictors of PROMIS-PF and KOOS-ADL. Predictive variables were included in multivariate models based on a significance of less than 0.010 in univariate regression. Mental health scores (ANX, DEP, MH29) were separately added to the base models to assess added predictive value.

RESULTS:

A total of 167 patients responded to the survey (response rate: 54.8%). Average follow up was 3.2 years and 44% of fractures were bicondylar. Prior to the inclusion of mental health outcomes, female gender (B=-2.98; p=0.04) and increasing BMI (B=-0.25, p=0.01) were independently associated with worse PROMIS-PF while ipsilateral lower extremity injury (B=-10.92, p=0.031), increasing BMI (B=-0.53, p=0.007), and postoperative infection (B=-10.12, p=0.023) were independently associated with worse KOOS-ADL. For PROMIS-PF and KOOS-ADL, respectively, MH29 (B=0.68, p=0.001; B=1.25, p=0.001), ANX (B=-0.39, p=0.001; B=-0.74, p=0.001), and DEP (B=-0.47, p=0.001; B=-0.86, p=0.001) were the strongest independent predictors of reported physical function when separately added to the base multivariate models. Addition of MH29 to the base model resulted in the largest adjusted R^2 and was associated with the largest R^2 change (Adjusted R^2 = 0.557, R^2 change = 0.371; Adjusted R^2 = 0.578, R^2 change = 0.310) for PROMIS-PF and KOOS-ADL, respectively.

DISCUSSION AND CONCLUSION:

This data raises the possibility that improving mental health parameters may be more important than the surgical method of treatment in the patients' final outcome. Mental health PROs are more strongly associated with self-reported physical function than fracture severity, soft tissue injury, or comorbidity status. MH29 outperformed ANX and DEP in predictive value for both PROMIS-PF and KOOS-ADL models.