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Should Depression Be Treated Before Lower Extremity Arthroplasty?

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ABSTRACT

Background: Patient optimization is becoming increasingly important before arthroplasty to ensure outcomes. It has been suggested that depression is a modifiable risk factor that should be corrected preoperatively. It remains to be determined whether psychological intervention before surgery will improve outcomes. We theorized that the use of preoperative depression scales to predict postoperative outcomes may be influenced by the pain and functional disability of arthritis. To determine whether depression is a modifiable risk factor that should be corrected preoperatively we asked the following questions: (1) What is the prevalence of depression in arthroplasty patients preoperatively? (2) Do depressive symptoms improve after surgery? (3) Is preoperative depression associated with outcome?

Methods: Patients scheduled for surgery completed a patient health questionnaire (PHQ-9) to assess the presence and severity of depression pre-operatively and one year post-operatively.

Results: Sixty-five of the 282 patients had a PHQ-9 score >10 indicating moderate depression and 57 (88%) improved to <10 postoperatively ($P = .0012$). Ten patients had a PHQ-9 score >20 indicating severe depression and 9 (90%) improved to <10 postoperatively ($P = .10$). Of the 65 patients who had a PHQ-9 score >10 preoperatively, the median postoperative Hip Disability and Osteoarthritis Outcome Score (N = 40) was 92.3, while the median postoperative Knee Injury and Osteoarthritis Outcome Score (N = 25) was 84.6. The median postoperative Hip Disability and Osteoarthritis Outcome Score and Knee Injury and Osteoarthritis Outcome Score in nondepressed patients were 96.2 and 84.6, respectively ($P = .9041$).

Conclusion: By diminishing pain and improving function through arthroplasty, depression symptoms improve significantly. Patients with depressive symptoms preoperatively had similar postoperative outcome scores compared to non-depressed patients. Patients should not be denied surgical intervention through optimization programs that include a depression scale threshold.

Level of Evidence: III.

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In an era of patient-reported outcomes and increasing governmental scrutiny, patient optimization is becoming increasingly important before arthroplasty to help ensure optimal outcomes. Patient optimization protocols have encouraged patients to stop smoking, maintain a body mass index < 40, an Hb A1c < 8.0, and an albumin > 3.5 before arthroplasty in order to improve outcomes.

Depression has been linked to suboptimal results following lower extremity arthroplasty [1]. It has been estimated that 10%-14% of Medicare patients undergoing arthroplasty carry a diagnosis of depression [1,2]. Patients with preoperative anxiety and depression had more than 6 times higher risk of dissatisfaction compared with patients with no anxiety or depression [2]. It also has been

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suggested that depression is a modifiable risk factor that should be corrected preoperatively [3–5].

Additionally, preoperative depression has been found to increase the risk of 30- and 90-day readmissions after total hip or total knee arthroplasty independent of other comorbid conditions [3,6]. Complications such as periprosthetic fracture, infection, and dislocation have also been shown to increase in patients with psychiatric diagnosis such as depression [7]. Finally; direct hospital costs were significantly higher in patients with a preoperative diagnosis of anxiety or depression [8]. Because of these concerns, it has been suggested that depression should be incorporated into risk stratification models for lower extremity arthroplasty [8].

While self-reported psychological questionnaires offer a glimpse of psychological health in the surgeon's office, they offer only a cursory assessment of the nature and severity of the disease state [4].

We theorized that the scores obtained on preoperative depression scales may be influenced by the pain and functional disability of arthritis. We were concerned that patients may be denied surgical intervention through optimization programs that include a depression scale threshold. In order to determine whether depression is a modifiable risk factor that should be corrected preoperatively or situational depression that will improve significantly by diminishing pain and function through arthroplasty, we asked the following research questions:

1. What is the prevalence of moderate or severe depression in arthroplasty patients preoperatively?
2. Does preoperative depression improve following total joint arthroplasty (TJA)?
3. Is preoperative depression associated with the outcome of TJA?

Materials and Methods

During the initial 6-month rollout of our institution's surgical optimization protocol, all primary total joint patients scheduled for surgery with 2 surgeons (TKF, BDS) completed a patient health questionnaire (PHQ-9) to assess the presence and severity of depression (Table 1). The PHQ-9 is a validated 9-question patient-reported measure that is used to screen for the presence and severity of depression. Additionally, it is a succinct evaluation tool that takes less than 3 minutes to complete and lends itself well to the clinical evaluation of a preoperative patient in a busy practice. It includes questions concerning levels of interest, difficulty sleeping, energy levels, eating habits, as well as suicide. This instrument has been validated in 3000 primary care patients as well as 3000 obstetricians and gynecologists patients [9]. The Warowl Institute for Health and Clinical Excellence endorsed the PHQ-9 for measuring depression severity and responsiveness to treatment in a primary care setting [10]. Each of the 9 questions can be answered on a severity scale of 0-3, accounting for a total score (maximum score of 27). A score of 10 indicates moderate depression that requires treatment and a score of 20 indicates severe depression. Table 2 defines the scoring interpretation for PHQ-9 [9,11]. While the PHQ-9 score is not used as a criterion for surgical intervention, it is part of the patient's medical history.

After IRB approval, a query of our electronic health record identified 282 primary total hip and knee patients that completed a PHQ-9 preoperatively. Lower extremity arthroplasty candidates from 2 of the authors' practices (TKF, BDS) were asked to complete the PHQ-9 at the time of surgery scheduling and at 1 year postoperatively. Patients were also asked to complete the Hip Disability and Osteoarthritis Outcome Score JR. (HOOS JR.) or the Knee Injury and Osteoarthritis Outcome Score (KOOS JR.) at the same intervals.

Additionally, patient demographics, need for antidepressant medication, and postoperative complications were documented. Telephone interviews were conducted with patients who had missing postoperative PHQ-9 questionnaires.

A total of 282 TJA patients completed the PHQ-9 preoperatively. The majority of patients were female ($n = 157$, 56%) and the median age of the study sample was 65 years (interquartile range [IQR], 57–72 years). Of the 282 patients, 144 patients underwent total hip arthroplasty while 138 underwent total knee arthroplasty. Two hundred and eighty patients completed a postoperative PHQ-9. Forty-nine (18%) patients reported taking antidepressants at the time of surgery, 221 (81%) patients did not report taking antidepressants at the time of surgery. We could not confirm this for 12 (11%) patients; 4 of whom reported preoperative depression (PHQ-9 score > 10).

Source of Funding

No external funding was received for this study.

Results

Patients reported significant improvement in depression after surgery. The median PHQ-9 score for the entire group preoperatively was 5 ($n = 282$; IQR, 2–9) while the median PHQ-9 score postoperatively was 1 ($n = 280$; IQR, 0–4; $P < .0001$). Sixty-five of the 280 (23%) patients had a PHQ-9 score > 10. Of the 65 patients who had a preoperative PHQ-9 score > 10, indicating moderate depression, 57 (88%) improved to <10 postoperatively ($P = .0012$). Of the 10 patients who had a preoperative PHQ-9 score > 20, indicating severe depression, 9 (90%) improved to <10 postoperatively ($P = .10$). Of the 49 patients who reported taking antidepressant medication, 40 (82%) reported still taking medications and 5 (10%) patients discontinued use. These data were unknown for the remaining 4 (8%) patients.

Of the 282 patients, 65 had a PHQ-9 score > 10 preoperatively, indicating moderate or severe depression, the median postoperative HOOS ($n = 40$) was 92.3 (IQR, 32.7–100), while the median HOOS postoperatively for nondepressed patients ($n = 98$) was 96.2 (IQR, 36.4–100). This difference was not significant ($P = .5711$). The median postoperative KOOS ($n = 25$) for depressed patients was 84.6 (IQR, 47.5–100), while the median postoperative KOOS ($n = 119$) for now depressed patients was also 84.6 (IQR, 20.9–100). This difference was not significant ($P = .9041$).

There were 6 patients who experienced a perioperative complication: 2 infections, 2 dislocations, and 2 leg length discrepancies. These patients all had a preoperative PHQ-9 score < 10. Eight patients complained of persistent pain. Six of these had a preoperative PHQ-9 score < 10 and a median postoperative score of 2.0 ($n = 5$; IQR, 0–4). Two had a preoperative PHQ-9 score > 10 and a median postoperative score of 4.0 (IQR, 1–7). This was not significantly different ($P = .845$). None of the 8 patients had a PHQ-9 score > 10 postoperatively ($n = 7$; IQR, 0–9).

Discussion

Preoperative patient optimization is crucial to improve arthroplasty outcomes. However, it is important to understand which risk factors for perioperative complications are truly modifiable. There is evidence-based support that improved outcomes can be obtained by addressing modifiable risk factors such as obesity [12], diabetic control [13], smoking cessation [14], nutrition [15], and anemia [16]. It is also clear that depressed patients have higher complications rates, higher rates of dissatisfaction, higher 90-day readmission rates, and higher overall direct hospital costs [2,3,7,8].

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