Primary Total Knee Arthroplasty in Patients With Fibromyalgia

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abstract

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No data on the results of total knee arthroplasty (TKA) in patients with fibromyalgia have been published. The purposes of this study were to review a cohort of patients with fibromyalgia undergoing TKA to determine the level of postoperative pain and satisfaction with the surgery, the incidence of postoperative surgical complications, and revision rates and their relationship to TKA design. One hundred ten patients with fibromyalgia (141 knees) who underwent primary TKA between 1990 and 2001 were studied. The average age was 64 years (range, 39-86 years), and the average follow-up was 7 years (range, 2-16 years). Forty-five knees were cruciate retaining, and 96 had a posterior stabilized design. Clinical outcome was assessed using the Knee Society Knee Score and satisfaction regarding the results of the procedure. Postoperative surgical complications and reoperations were obtained from the registry. Sixty-two patients (44%) continued with some pain after TKA. Eighty-five patients (82%) were satisfied with the results. The most common complications were arthrofibrosis and symptomatic instability. The revision rate was 6% (8 knees). Survivorship free from revision at 7 years was 89% for cruciate retaining knees and 98% for posterior stabilized knees.

Patients with fibromyalgia undergoing primary TKA have a high prevalence of complications and pain. Despite continued pain, the majority of patients were satisfied with the results and reported improvements after TKA. This data should be used to counsel patients with fibromyalgia preoperatively regarding limited goals with respect to pain relief and suggests that a multimodal individualized treatment program may be necessary to achieve optimal outcomes in patients with fibromyalgia.
Fibromyalgia is a chronic pain syndrome that is characterized by diffuse musculoskeletal pain, stiffness, and anodynia at specified tender points in the absence of otherwise apparent organic disease. Approximately 2% of the US population (women, 3.4%; men, 0.5%) is affected by fibromyalgia. In 1990, the American College of Rheumatology established criteria that comprise the diagnosis of fibromyalgia, which include a history of widespread pain for at least 3 months involving both sides of the body above and below the waist, axial skeletal pain (cervical spine, anterior chest, thoracic spine, or low back pain), and tenderness to digital palpation of at least 11 of 18 specified tender points. Despite these criteria, no consensus exists on its cause, treatment, or whether it merits consideration as a distinct clinical entity.

The etiology of fibromyalgia is unclear and may be multifactorial. Accumulating evidence suggests that fibromyalgia may be caused by disordered central pain processing. Patients with fibromyalgia experience pain differently than those without the disease. In addition, evidence suggests that patients with fibromyalgia may have an increased incidence of joint hypermobility. Increased joint laxity could cause stress and microtrauma at soft tissue attachment sites and become a source of joint pain. Furthermore, soft tissue laxity may negatively influence outcome in patients receiving a minimally constrained knee design, such as cruciate retaining knees.

Patients with fibromyalgia may also develop end-stage knee arthritis and eventually require total knee arthroplasty (TKA). Currently, no data on the results of TKA in patients with fibromyalgia have been published. We hypothesized that the results of TKA in patients with fibromyalgia would be worse than those reported in patients without fibromyalgia. The purpose of this study was to review a cohort of patients with fibromyalgia undergoing TKA to determine the levels of postoperative pain and satisfaction with the surgery, the incidence of postoperative surgical complications, and the revision rates and their relationship to TKA design.

Materials and Methods

After Institutional Review Board approval, the joint registry was used to identify patients who underwent primary TKA between 1990 and 2001. During the study period, 9408 primary TKAs were performed at our institution. These patients were cross-referenced with a surgical index to identify patients who had fibromyalgia at surgery. One hundred sixty-nine procedures in 130 patients with fibromyalgia were identified. The medical charts of these patients were reviewed to confirm the diagnosis. One hundred ten patients (141 knees) fulfilled the inclusion criteria, which included patients with an initial diagnosis of fibromyalgia well documented in their medical history by an internist or rheumatologist and were either followed up on a regular basis or received drugs for pain modulation specifically for this condition. Twenty-eight knees in 20 patients were excluded because fibromyalgia could not be confirmed.

There were 102 (93%) women, with an average age of 64 years (range, 39-86 years) and a mean body mass index of 33 kg/m² (range, 21-57 kg/m²) at surgery. Preoperative diagnoses included degenerative joint disease in 126 (90%) knees, inflammatory arthritis in 8 (5%), avascular necrosis in 5 (3.5%), and post-traumatic arthritis in 2 (1.5%). Thirty-five knees underwent previous operations, including arthroscopic procedures for meniscectomy and synovectomy (31 knees), open reduction and internal fixation (2 knees), femoral osteotomy (1 knee), and arthroscopic debridement for infection (1 knee). Knee design selection was based on the surgeons’ preferences. All 3 components were cemented in 139 knees, with 2 knees having an uncemented femoral or patellar component. Forty-five knees were cruciate-retaining, and 96 had a posterior-stabilized design. Eleven knees had an all-polyethylene tibial component.

Clinical follow-up occurred through the joint registry at 8 weeks, 1, 2, and 5 years, and every 5 years thereafter. The average follow-up was 7 years (range, 1 month to 15 years). Four patients (4 knees) were lost to follow-up; 2 patients (2 knees) required revision surgery within 2 years, and 12 patients (14 knees) died during the study period. Forty-two patients (56 knees) were seen for examination at last follow-up, whereas 60 patients (76 knees) had their last follow-up by responding to a questionnaire by phone or mail. Clinical outcome was assessed using the Knee Society Score pre- and postoperatively. Postoperative satisfaction regarding the results of the procedure was measured as improvement, no improvement, or worsening of symptoms. The use and type of pain medication was also available.

Postoperative complications and reoperations were obtained from the registry and confirmed during review of the clinical notes. Orthopedic complications included arthrofibrosis and knee instability. Arthrofibrosis was defined as postoperative stiffness with a range of motion (ROM) of <90° that required manipulation. Instability included patients who were symptomatic postoperatively and were unstable during physical examination.

All patients (141 knees) were included in the analysis of the surgical complications and revisions. However, only those with a minimum 2-year follow-up (131 knees) were included in the analysis of the level of postoperative pain and satisfaction. The normality of the distribution of the continuous variables was assessed before analysis and, if necessary, the data were transformed or nonparametric methods were used. Descriptive statistics were used to report the number of patients with pain, the severity of pain, satisfaction, the number and types of complications,
and the number of revision surgeries. Wilcoxon rank test was used to analyze the Knee Society Score pre- and postoperatively. Differences between cruciate retaining and posterior stabilized designs were tested using Fisher’s exact test to compare the rates of arthrofibrosis, manipulations, instability, and revisions in patients with fibromyalgia after TKA. The end-point for survivorship analysis was defined as revision for any reason.

RESULTS

Eighty-five patients (108 knees) reported improvements after TKA (82%), 4 patients (7 knees) reported no improvements (5%), and 3 patients (3 knees) said their knees were worse postoperatively (2%). Patient satisfaction information was not available for 10 patients (14 knees). Postoperatively, 62 (44%) of 110 patients continued with some degree of knee pain. Of these, 30 (48%) had mild pain, 18 (29%) had moderate pain, and 1 (<1%) had severe pain, with unknown pain levels in 13 patients. At last follow-up, the Knee Society Score improved from a mean of 60 points (range, 30-98 points) preoperatively to a mean of 84 points (range, 39-100 points) (P<.001) postoperatively. Twenty-four patients (22%) were still taking pain medications (nonsteroidal anti-inflammatory drugs or narcotics) at last follow-up. A common postoperative diagnosis made by surgeons was pes anserine bursitis, which was treated by injecting cortisone in 24 (17%) knees.

Postoperative complications are shown in the Table. In the early postoperative period, 13 knees (9 patients) had ROM, 11 of which (7 patients) required manipulation under anesthesia. One patient required a second manipulation for persistent stiffness. The manipulation rate in our study population was 8% (11 knees). No difference existed in the manipulation rates between posterior-stabilized and cruciate-retaining knee designs. At follow-up, 13 (9%) knees in 9 patients were diagnosed with symptomatic instability, 4 of whom (4 knees) were revised for global instability. The other 9 knees included 2 with patellar instability, 2 with medial or lateral instability, and 5 with flexion instability (cruciate-retaining, 3; posterior-stabilized, 2). No statistically significant difference existed in instability between cruciate-retaining and posterior-stabilized designs (5/40 knees [12%] vs 8/88 knees [9%]; P=0.7).

Eight (6%) knees underwent subsequent revision surgery. Four knees were revised for instability. Other reasons for revision were pain (1 knee), aseptic loosening of the tibial component (1 knee), prosthesis fracture (1 knee), and polyethylene wear (1 knee). The overall survivorship of the cohort was 94% at 7 years. Excluding the patient with the revision resulting from a component fracture, a statistically significant difference (P=.03) existed in the number of revisions performed in patients with cruciate-retaining designs (5/40 knees, 12%) compared with those with a posterior-stabilized design (294 knees, 2%). The survivorship of these groups at 7 years was 89% for the cruciate-retaining group and 98% for the posterior-stabilized group.

DISCUSSION

Fibromyalgia is a chronic pain syndrome that affects 2% of the US population. Alterations in central pain processing with resultant low pain tolerance thresholds have been implicated as the potential etiology for this syndrome, and it has also been associated with joint hypermobility. Fibromyalgia may coexist with knee arthritis, and some patients require TKA to treat end-stage arthritis. Currently, no data on the results of TKA in this patient population have been published. We hypothesized that the results and complications resulting from TKA would be worse than in the general population due to the underlying characteristics of patients with fibromyalgia.

Our study had several limitations. First, the exact criteria for the diagnosis of fibromyalgia is difficult to confirm from chart review. However, this is similar to clinical practice, where patients are often classified as having fibromyalgia without formal diagnostic criteria. Our review process was specific enough to select patients with clinical characteristics that likely represented patients with fibromyalgia. Similarly, the exclusion of patients whose clinical notes did not contain specific criteria despite having this diagnosis might have been erroneously excluded. A specific measurement for preoperative soft tissue laxity was not available in the clinical notes, and the prevalence of lax joints in patients with fibromyalgia undergoing TKA, which has been linked with fibromyalgia, is unknown. Lastly, many patients were not local, with only 42 patients (56 knees) available for physical examination at last follow-up, which may underestimate the number of patients with instability and other postoperative problems. The rest of the patients completed the total joint questionnaire by mail or telephone. If problems with TKA are evident, patients usually return to the clinic for examinations.
Our midterm follow-up study of a relatively large group of patients with fibromyalgia revealed that the majority of patients were satisfied with the operation despite a seemingly high prevalence of continued pain. The postoperative Knee Society Scores were comparable with those reported by Brander et al\(^7\) in patients undergoing primary TKA without fibromyalgia. However, \(<20\%\) of the patients in that study reported pain 1 year postoperatively, whereas \(44\%\) of the patients in the current study had some degree of pain at mid-term follow-up.

The prevalence of arthrofibrosis has been reported to range from \(1.3\%\) to \(4.7\%\) after primary TKAs\(^{11,14}\). Our study showed a higher prevalence (\(9\%\)) of this complication in patients with fibromyalgia. The problems caused by limited ROM are likely multifactorial, but limited ROM mostly results from suboptimal postoperative rehabilitation caused by poor postoperative pain control.\(^14\) Tolerance to narcotic drugs is also problematic because many of these patients take narcotics preoperatively. Multimodal individualized treatment programs may be necessary to achieve optimal outcomes in patients with fibromyalgia.\(^15\) Regional nerve blocks and the use of preemptive analgesia are currently our standard for TKA. We recommend that patients try to stop taking narcotics preoperatively and involve the pain service during their hospital stay to help with postoperative pain management and to facilitate postoperative pain rehabilitation.

The reported prevalence of generalized hypermobility in North American and European Caucasian adults is between \(5\%\) and \(15\%\).\(^6,8,12\) Hudson et al\(^7\) studied 82 patients with soft tissue rheumatism, including patients with fibromyalgia. In their study, \(36\%\) of patients with fibromyalgia had hypermobile joints, suggesting an increased frequency of lax ligaments in these individuals. Soft tissue laxity could explain some of the soft tissue pain perceived by these patients and why a relatively high prevalence of complications associated with instability existed after TKA. Contrary to most studies that have shown no difference in pain and function between cruciate retaining and posterior stabilized designs,\(^16\) posterior stabilized TKA fared better than cruciate-retaining TKA in the current study at mid-term follow-up and is currently our recommended TKA design in patients with fibromyalgia who may be prone to symptomatic instability.

**CONCLUSION**

A high prevalence of complications and pain existed in patients with fibromyalgia undergoing primary TKA. Almost half of the patients reported continued knee pain at last follow-up, most commonly over the medial aspect of the knee. Despite continued pain, the majority of patients were satisfied with the results and reported improvements following TKA. This data should be used to counsel patients with fibromyalgia preoperatively regarding limited goals with respect to pain relief and suggest that a multimodal individualized treatment program may be necessary to achieve optimal outcomes in patients with fibromyalgia.

**REFERENCES**