The Journal of Arthroplasty xxx (2016) 1–7

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Original Article

Patient-Reported Outcomes, Quality of Life, and Satisfaction Rates in Young Patients Aged 50 Years or Younger After Total Knee Arthroplasty

Graham Seow-Hng Goh, MBBS [a, *],
Ming Han Lincoln Liow, MBBS, MRCS, MMed (Ortho) [a, b],
Hamid Rahmatullah Bin Abd Razak, MBBS, MRCS, MMed (Ortho) [a],
Darren Keng-Jin Tay, MBBS, FRCS [a], Ngai-Nung Lo, MBBS, FRCS [a],
Seng-Jin Yeo, MBBS, FRCS [a]

[a] Department of Orthopaedic Surgery, Singapore General Hospital, Singapore
[b] Department of Orthopaedics, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts

ARTICLE INFO

Article history:
Received 26 April 2016
Received in revised form
19 June 2016
Accepted 14 July 2016
Available online xxx

Keywords:
total knee arthroplasty
patient-reported outcome measures
quality of life
satisfaction
young
age 50

ABSTRACT

Background: Recent studies have shown a discrepancy between traditional functional outcomes and patient satisfaction, with some reporting less than 85% satisfaction in older patients undergoing total knee arthroplasty (TKA). As native knee biomechanics are not completely replicated, the resulting functional limitations may cause dissatisfaction in higher-demand individuals. Few studies have recorded patient-reported outcomes, health-related quality of life scores, and patient satisfaction in a young population undergoing TKA.

Methods: One hundred thirty-six primary TKAs were performed in 114 patients aged 50 years or younger (mean age, 47.0 years; range, 30-50 years) at a single institution. The main diagnoses were osteoarthritis (85%) and rheumatoid arthritis (10%).

Results: The range of motion, Knee Society Score, Oxford Knee Score, and Physical and Mental Component Scores of Short Form-36 increased significantly ($P < .001$). At 2 years, 85.3% of patients had good/excellent knee scores, 71.3% had good/excellent function scores, 94.9% met the minimal clinically important difference for the Oxford Knee Score, and 84.6% met the minimal clinically important difference for the Physical Component Score. We found that 88.8% of patients were satisfied with their surgeries, whereas 86.8% had their expectations fulfilled. Survivorship using revision as an end point was 97.8% at a mean of 7 years (range, 3-16 years).

Conclusion: Patients aged 50 years or younger undergoing TKA can experience significant improvements in their quality of life, have their expectations met, and be satisfied with their surgeries, at rates similar to those of non–age-restricted populations. Surgeons should inform them of these benefits and the potential risk of revision surgery in the future, albeit increasingly shown to be low.

Total knee arthroplasty (TKA) is a successful treatment for advanced arthritis of the knee. Studies with a long-term follow-up have consistently found the operation to be successful over time [1]. However, young patients with symptomatic end-stage knee arthritis continue to pose a difficult clinical problem to orthopedic surgeons. In the past, TKA was only recommended for a more elderly population as some studies found higher rates of failure in patients younger than 60 years [2,3]. In contrast, studies in the past decade have shown that TKA in patients younger than 55 years have success rates comparable to those seen in a more elderly

Funding: Nil.

No author associated with this paper has disclosed any potential or pertinent conflicts which may be perceived to have impending conflict with this work. For full disclosure statements refer to http://dx.doi.org/10.1016/j.arth.2016.07.043.

* Reprint requests: Graham Seow-Hng Goh, MBBS, Department of Orthopaedic Surgery, Singapore General Hospital, 20 College Road, Academia, Level 4, 169865, Singapore.

http://dx.doi.org/10.1016/j.arth.2016.07.043
0883-5403/

population [4]. As the prevalence of arthritic disease in the young individual is likely to increase [5], it is important that we evaluate the effectiveness of TKA in this challenging population.

Many studies have investigated the outcomes of TKA in young patients [4,6-21]. Despite the wealth of literature, we noted that most studies in the past had small sample sizes or data collected retrospectively. Most midterm and long-term studies on TKA in younger patients also included a relatively large percentage of inactive patients with rheumatoid arthritis [6,8,9,11,17].

Furthermore, previous studies mostly measured surgeon-driven objective scales such as the Knee Society Score [6,8-10,12-16] and the Hospital for Special Surgery Score [4,7,11,19], whereas only a few analyzed patient-reported outcome measures (PROMs) such as the Oxford Knee Score (OKS) [17,18,20]. Of note, the aforementioned studies focused mainly on pain relief and functional outcomes after TKA. However, recent studies have shown that the views of surgeons and their patients on the outcome of medical and surgical interventions do not always agree, especially with respect to the assessment of pain and function [22,23]. Likewise, functional outcome scores do not necessarily correlate with patient satisfaction in joint arthroplasty [24], with some studies reporting less than 85% rates of satisfaction in older patients undergoing TKA [25-27]. For these reasons, there is a growing recognition that PROMs, health-related quality of life (HRQoL) scores, and assessments of satisfaction should be used for evaluation [28].

In addition, as native knee biomechanics are not completely replicated by contemporary knee arthroplasties, patients with total knee prostheses experience functional limitations in squatting, kneeling, and pivoting activities. These limitations may result in dissatisfaction and failure to meet expectations in higher-demand individuals [29-31]. A high level of residual symptoms has been reported in young patients after TKA [21]. Two recent studies reported the satisfaction rates in patients younger than 60 years at 1 year after surgery [20,21]. However, conflicting findings were noted, with one study reporting 71% satisfaction [20], whereas the other reporting 90% satisfaction with the overall functioning of their knees [21]. Although the benefits of pain relief and functional improvement among younger patients with symptomatic end-stage arthritis have been described [6-19], the rate of patient satisfaction, fulfillment of expectations, and improvement in HRQoL among this young population still remain unclear.

Therefore, we designed a study to evaluate patient-reported functional outcomes, HRQoL scores, minimal clinically important differences (MCIDs), patient satisfaction, and fulfillment of expectations in a group of patients aged 50 years or younger undergoing TKA using modern prostheses. We hypothesized that patients younger than 50 years will have significant improvements to their quality of life and have comparable rates of satisfaction and expectation fulfillment when compared to historical controls.

Patients and Methods

Patient Selection

We conducted a retrospective review of prospectively collected registry data of 6166 primary TKAs performed between 1999 and 2013 at a single institution. A total of 136 (2.2%) TKAs were performed on patients aged 50 years or younger by 4 experienced arthroplasty surgeons. The indication for surgery in all patients was symptomatic knee arthritis that was severe enough to warrant TKA after a trial of nonoperative therapy. The 136 primary TKAs were performed on 114 patients (76 men and 38 women) with a mean age of 47.0 years (range, 30-50 years) and a mean body mass index of 30.5 kg/m^2 (range, 17-51 kg/m^2). The diagnoses were 115 cases of osteoarthritis (85%), 14 cases of rheumatoid arthritis (10%), 3 cases of avascular necrosis, 3 cases of ankylosis, and 1 case of hemophilic arthropathy. Of the diagnoses of osteoarthritis, 6 were cases of posttraumatic osteoarthritis.

Surgical Technique

Operative anesthesia was either general or spinal. The prostheses used in this study were the NexGen (Zimmer Inc, Warsaw, IN) in 76 knees, PFC (DePuy Inc, Warsaw, IN) in 45 knees, Genesis II (Smith & Nephew) in 8 knees, and Scorpio NRG (Stryker) in 7 knees. Each operation was performed with the aid of a tourniquet after intravenous prophylactic antibiotics (cefazolin or vancomycin if the patient was allergic to penicillins). A midline skin incision was made, and the joint was exposed through a standard medial parapatellar approach with patellar eversion. All arthroplasties were performed using measured resection and gap balancing techniques. All components were cemented. A posterior-stabilized implant was used in 90 cases (66.2%), whereas a cruciate-retaining implant was used in 46 cases (33.8%); 41 patellas were resurfaced using an all-polyethylene component of dome design, whereas 95 patellas were not resurfaced. All patients received graduated compression stockings and intermittent pneumatic calf pumps as mechanical prophylaxis against deep vein thrombosis; high-risk patients received oral or parenteral chemoprophylaxis. Patients also underwent the same postoperative analgesic regime and rehabilitation protocol.

Clinical Evaluation

Two experienced independent physiotherapists performed the preoperative and postoperative assessment of all patients. They were blinded to the measurements of their colleagues. All the patients had preoperative range of motion (ROM), Knee Society Score (KSS), OKS, and Short Form-36 (SF-36) scores. The 8 domains (Physical Functioning, Social Functioning, Role-Physical, Bodily Pain, Mental Health, Role-Emotional, Vitality, and General Health) of SF-36 were transformed into 2 summary scores: the Physical Component Score (PCS) and Mental Component Score (MCS). The advantages of the PCS and MCS are a smaller confidence interval and elimination of both floor and ceiling effects [32]. For the KSS, ratings of 80-100 were considered excellent, 70-79 good, 60-69 fair, and less than 60 poor. The proportion of patients that met the MCID for the OKS and PCS was also recorded. The following MCID thresholds were identified from the existing literature: OKS (5 points) [33] and SF-36 scores (PCS: 10 points and MCS: 10 points) [34]. Patients who had outcome scores that met the MCID were deemed to perceive a meaningful improvement in functional outcome and HRQoL. All scores were evaluated again at 6 months and 2 years postoperatively, together with an assessment of the patient's fulfillment of expectations and satisfaction with surgery. Expectation and satisfaction scores were recorded using a 7- and 6-level Likert scales, respectively, with higher scores indicating poorer results, similar to a scale used by Klit et al [20]. We further stratified the scores into excellent, good, fair, and poor (Table 1). Data with regard to any further intervention were obtained from the hospital records. Complication rate and revision as an end point were reviewed. All patients were followed up for a mean of 6.7 years (range, 3-16 years).

Statistical Methods

All continuous data are expressed in terms of mean and standard deviation of the mean. Repeated-measures 1-way analysis of variance was used to determine any significant differences between the scores obtained at set time intervals before and after TKA. We defined statistical significance at the 5% ($P \leq .05$) level. Statistical analysis was carried out with SPSS software, version 20.0 (SPSS Inc, Chicago, IL).