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Original Article

Preoperative Anxiety and Depression Correlate With Dissatisfaction After Total Knee Arthroplasty: A Prospective Longitudinal Cohort Study of 186 Patients, With 4-Year Follow-Up

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ABSTRACT

Background: After more than 4 decades experience of total knee arthroplasty (TKA), there is still a group of patients who are not satisfied with the outcome. In spite of the improvement of many aspects around the procedure, for unexplainable reasons, patient dissatisfaction is still approximately the same. We conducted this study to analyze correlations between preoperative psychological aspects and dissatisfaction after TKA.

Methods: A total of 186 patients were operated with a primary TKA. Patients filled out the Hospital Anxiety and Depression Scale, Visual Analog Pain Scale (0-100), and Knee injury and Osteoarthritis Outcome Score preoperatively and 4 years postoperatively. Four years postoperatively, the patients also scored their satisfaction degree with the outcome of the surgery.

Results: Of 186 patients, 27 (15%) reported that they were dissatisfied or uncertain with the result of their TKA 4 years postoperatively. Sixteen of those 27 patients had reported anxiety/depression preoperatively compared with 11 of 159 (7%) in the satisfied or very satisfied groups. Patients with preoperative anxiety or depression had more than 6 times higher risk to be dissatisfied compared with patients with no anxiety or depression ($P < .001$). Patients with deep prosthetic infection had 3 times higher risk to be dissatisfied with the operation outcome ($P = .03$). Dissatisfied patients had 1-day longer hospital stay compared with the satisfied group ($P < .001$).

Conclusion: Preoperative anxiety and/or depression is an import predictor for dissatisfaction after TKA. Psychological assessment and treatment preoperatively might improve degree of satisfaction.

Dissatisfaction after unrevised total knee arthroplasty (TKA) has historically been between 6% and 14% [1-12], and if one adds the group uncertain to the dissatisfied group, it can be up to 28% [13]. There are several explainable reasons of poor outcome after TKA like patella-related problems, infection, stiffness, instability, periprosthetic fracture, tendon rapture, loosening, and nerve injury. Other well-known extra-articular reasons of poor outcome like hip, spine, vascular disease, or chronic regional pain syndrome might be contributing [14]. There are studies of joint arthroplasties that suggest that factors not primarily related to structural tissue changes but rather of psychological nature are involved [13,15-17]. In our previous study from the Swedish Knee Arthroplasty Register, we found that patients, who were dissatisfied, had similar performance tests, clinical, and radiographic findings as compared with those who were very satisfied. The patients who reported poor response after TKA were unhappy, as demonstrated by Visual Analog Pain Scale (VAS) pain and Hospital Anxiety and Depression scale (HAD), despite the absence of a discernible objective reason for revision [18]. A limitation of the study was the absence of preoperative data regarding psychological assessment of patients. Based on this, we designed the present study to better analyze correlations between preoperative psychological factors and dissatisfaction.

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Patients and Methods

A total of 186 consecutive TKA patients having primary osteoarthritis were included. We excluded patients having bilateral TKA, dementia, or not being able to speak Swedish. The patients in this study were included in another study regarding the effect of continuous intraarticular analgesia on pain and rehabilitation after TKA [19]. Total number of patients included in that original article were 200, and 14 of these patients were lost during the follow-up period (12 deceased, 2 refused to participate). The patients were operated on between January 2010 and April 2011. All patients had a standard straight central skin incision, medial parapatellar arthrotomy, and preparation of femur and tibia according to the instructions of the prosthesis manufacturer. Patients received either the cruciate-retaining Triathlon knee (Stryker, United Kingdom) in 151 patients or the cruciate-retaining PFC knee (DePuy, United Kingdom) in 35 patients, depending on the surgeon's preference. Five orthopedic surgeons who were subspecialized in arthroplasty performed the surgeries. Spinal anesthesia was used as a standard method (87%), while the remaining patients received general anesthesia. Premedication and postoperative analgesia were standardized. Patients filled out the HAD [20], VAS pain (0-100 mm, where 0 = no pain and 100 = intolerable pain), Knee Injury and Osteoarthritis Outcome Score (KOOS) questionnaire (0-100, where 0 = major problem and 100 = no problem) [21], and pain drawing with predefined body region to identify patients with chronic widespread pain [22] preoperatively, and 4 years postoperatively. Four years postoperatively, patients also filled out their satisfaction degree regarding the operated knee as very satisfied, satisfied, uncertain, or dissatisfied [10]. For statistical analysis reasons, we merged the satisfaction degree data to 2 groups: satisfied (very satisfied and satisfied groups) and not satisfied (uncertain and dissatisfied groups). Active range of motion (ROM) of the knee (goniometry) was measured preoperatively; VAS pain, analgesic consumption, and wound-healing complications were also recorded. Preoperative radiographic assessment was done according to Kellgren and Lawrence system for classification of osteoarthritis. The patient's files regarding complications and reoperation were checked 4 years postoperatively in a complications registry and patient files.

Statistics

A Cox multiple regression analysis with constant follow-up and robust variance estimation [23] was used to study relative risks for categorical variables among the dissatisfied group. Regarding continuous variables, like the mean difference between 2 groups, they were analyzed by the analysis of covariance method. In both methods, patients' gender, age, and body mass index preoperatively and at 4 years postoperatively were included. A P value of <.05 was considered to be statistically significant. A power analysis had been performed for the original article [19], which estimated that 200 patients were sufficient to find differences between the 2 groups for that study, and our statistician considered it to be valid also for the outcome in this study. Statistical analyses were performed using the Stata 12.0 program.

Ethics

The study and study registration was performed in compliance with the Helsinki Declaration, and all patients had given their informed written consent. The ethics committee of the Faculty of Medicine approved the study (Dnr 2009/368). This is the same approvement number as the original study about continuous intraarticular analgesia [19].

Table 1
Patient Characteristic.

	Not Satisfied (n = 27)	Satisfied (n = 159)
Age, y[a]	72 (8)	73 (10)
Sex, F/M	16/11	104/55
BMI[a]	30 (5)	30 (5)
ASA 1/2/3	7/17/3	34/108/17
Charnley A/B/C	7/5/15	49/48/62
Anesthesia spinal/general	23/4	139/20
LOS[a], d	5 (1)	4 (1)
ROM[a] preop	109 (9)	113 (14)
K/L grade 1-2	9/27	37/159
Chronic widespread pain preop	7/27	21/159
Chronic widespread pain 4 y	14/27	26/159
VAS[a] pain preop	65 (12)	60 (16)
VAS[a] pain 4 y	56 (18)	11 (10)
Anxiety/depression preop	14/27	12/159
Anxiety/depression 4 y	16/27	11/159
Deep infection	2/27	3/159
Superficial infection	2/27	4/159
Stiffness (flexion <90°)	2/27	7/159

BMI, body mass index; LOS, length of stay in hospital; K/L, Kellgren and Lawrence; VAS, Visual Analog Pain Scale; ROM, range of motion; ASA, American Society of Anaesthesiologists Physical Status Classification.
[a] mean value, standard deviation in brackets.

Results

Patient characteristics and the overall result are shown in Tables 1-3. A total of 27 of the 186 patients (15%) reported that they were not satisfied (uncertain or dissatisfied) with the result of their TKA 4 years after surgery. A total of 16 of those 27 patients reported anxiety and/or depression according to the HAD score compared with 11 of 159 (7%) in the satisfied group (satisfied and very satisfied) at the 4-year follow-up. As shown in Table 2, we found that the patients who preoperatively had anxiety/depression had more than 6 times higher risk to be dissatisfied after TKA as compared with patients without preoperative anxiety/depression. Mean length of stay in hospital at the time of surgery for the group that was dissatisfied at 4-year follow-up was 1 day more as compared with the satisfied group. Patients who had a postoperative deep infection had 3 times higher risk to be dissatisfied 4

Table 2
Crude Estimates, Relative Risk (RR) for Dissatisfaction.

Factor	RR	95% CI	*P* Value
Age	0.98	0.94-1.03	.5
Gender	0.80	0.39-1.63	.5
BMI	1.04	0.97-1.11	.3
Deep infection	2.90	0.93-9.04	.07
Superficial infection	2.40	0.73-7.91	.2
Stiffness (flexion <90°)	1.57	0.44-5.66	.5
K/L grade 1-2	0.66	0.32-1.36	.3
ASA	0.89	0.47-1.71	.7
LOS	1.56	1.34-1.82	<.001
Chronic widespread pain preop	1.37	0.87-2.14	.2
VAS pain preop	1.02	1.00-1.05	.07
ROM preop	0.98	0.96-1.00	.08
Anxiety/depression preop	6.63	3.52-12.49	<.001
KOOS pain preop	0.99	0.97-1.01	.6
KOOS symptom preop	0.99	0.96-1.01	.2
KOOS ADL preop	0.99	0.97-1.01	.2
KOOS Sport preop	0.99	0.97-1.02	.4
KOOS QOL preop	0.99	0.97-1.02	.6

CI, confidence interval; BMI, body mass index; K/L, Kellgren and Lawrence; LOS, length of stay in hospital; VAS, Visual Analog Pain Scale; KOOS, Knee Injury and Osteoarthritis Outcome Score; ROM, range of motion; ASA, American Society of Anaesthesiologists Physical Status Classification; ADL, activity of daily living; QOL, quality of life.