Comparison of Quality of Life Between Elderly Patients Undergoing TKA

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abstract

The purpose of this study was to compare the short-term changes in quality of life for patients younger than 80 years with those 80 years and older undergoing total knee arthroplasty (TKA). It was hypothesized that patients 80 years and older had a similar quality of life after TKA compared with those younger than 80 years.

All consecutive patients undergoing primary TKA were enrolled in this prospective, comparative, prognostic (level I evidence) study and were stratified into 2 groups based on their age (younger than 80 years and 80 years and older). Data on quality of life assessed using the Short Form 36 health survey were obtained preoperatively and 1 year postoperatively (short-term follow-up) and were compared between groups. A total of 328 (83.89%) patients younger than 80 years (mean age, 70.7 years) and 63 (16.11%) patients 80 years and older (mean age, 82.1 years) were included. No significant differences in preoperative quality of life were observed between groups. Postoperative physical function, vitality, social function, and physical component summary were lower in patients 80 years and older. Older patients had a lower difference between pre- and postoperative values in Short Form 36 physical function and role–emotional scores.

Patients 80 years and older had a similar improvement in quality of life 1 year after TKA compared with patients younger than 80 years. Therefore, changes in quality of life justify TKA as a treatment option for elderly patients with end-stage knee osteoarthritis.

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Life expectancy has dramatically increased in the past century in developed countries. Currently, more people are living into their eight and ninth decades. Total knee arthroplasty (TKA) is a successful treatment for elderly patients with knee osteoarthritis because TKA has an overall survivorship greater than 90% and produces good results in terms of function and pain relief.1-10 Despite these results, some authors have questioned the benefits of TKA in patients older that 80 years because of the higher complication rates in elderly patients compared with younger patients.10 These concerns have led to several studies comparing the results of TKA between elderly and young patients.2,3,6,7 Most studies have found comparable results in terms of function, pain relief, satisfaction, and radiographic outcomes.2,4,6,7 Therefore, performing TKA in elderly patients has been recommended whenever indicated. However, few studies have compared quality of life between patients younger than 80 years and 80 years and older.6,8 and those that did not assess the change in quality of life after TKA.

The purposes of the current study were to compare the short-term changes in quality of life between patients younger than 80 years with those 80 years and older undergoing TKA and to compare their cognitive status, function, and pain. It was hypothesized that patients 80 years and older had a similar quality of life after TKA compared with younger patients.

Materials and Methods

All consecutive patients (439) with knee osteoarthritis in whom a primary TKA was indicated at the authors’ institution between January 2007 and February 2008 were enrolled in this prospective, comparative, prognostic (level I evidence) study. Patients with revision TKA, contralateral TKA, unicompartamental knee arthroplasty, and cognitive disorders or language barriers precluding the understanding of questionnaires and medical interviews were excluded from this study. Quality of life, cognitive, functional, and symptomatic (pain) data were obtained preoperatively and 1 year postoperatively (short-term follow-up) and were compared between patients younger than 80 years and those 80 years and older. Postoperative complications were compared between groups. All patients gave informed consent prior to participation in this investigation. Institutional review board approval was obtained before beginning the investigation.

Outcome Measurements

Quality of life was assessed using the Short Form 36 (SF-36).11 The SF-36 is a widely used, validated, multipurpose, short-form health survey comprising 8 dimensions (physical function, role-physical, bodily pain, general health, vitality, social function, role-emotional, and mental health) and 2 summary scores (physical and mental components). Each dimension score ranges from 0 to 100, with higher scores indicating a better quality of life. All values in both groups were standardized with respect to normative values from the reference population.12 Cognitive status was assessed using the Spanish version of the Short Portable Mental Status Questionnaire by Pfeiffer, which evaluates the intellectual deficit of the patient using 10 items provided by the surgeon.13 Knee function was evaluated with the Knee Society score (KSS),14 the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scale, and passive knee range of motion (ROM) evaluation. The KSS is a clinical test divided into knee and functional rating categories. Each category has a maximum score of 100 points. The knee rating is based on pain, ROM, stability, and alignment. The functional score is based on walking distance, the ability to walk up and down stairs, and whether an assistive device is needed.14 The WOMAC scale consists of 24 items divided into 3 subscales: pain, stiffness, and physical function. All questionnaires (SF-36, KSS, and WOMAC) have been validated in Spanish.15-17 Passive knee ROM was quantified through a manual goniometer with the patient lying in the supine position. Symptomatic data were based on knee pain, which was assessed using the visual analog scale. All patients classify their satisfaction with their TKA into 6 categories: completely unsatisfied, quite unsatisfied, a little unsatisfied, a little satisfied, quite satisfied, completely satisfied.

Statistical Analysis

Descriptive statistics were used to summarize demographic, quality of life, cognitive, radiographic, functional, and symptomatic data. A Chi-square analysis was used to compare categorical variables, and Mann-Whitney U test was used to compare quantitative variables. All statistical analyses were performed using SPSS version 15.0 software (SPSS, Inc, Chicago, Illinois). The alpha level was set at 0.05.

Results

A total of 391 primary TKA (88 [22.5%] men and 303 [77.5%] women) met the inclusion criteria and were included in the

<table>
<thead>
<tr>
<th>Variable</th>
<th>Younger than 80 Years (n=328)</th>
<th>80 Years and Older (n=63)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD age, y</td>
<td>70.7±5.6</td>
<td>82.1±1.8</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Gender, No. M/F</td>
<td>73/255</td>
<td>15/48</td>
<td>.8</td>
</tr>
<tr>
<td>Side, No. L/R</td>
<td>184/145</td>
<td>37/26</td>
<td>.7</td>
</tr>
<tr>
<td>BMI</td>
<td>31.4 (4.8)</td>
<td>30.2 (5)</td>
<td>.09</td>
</tr>
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</table>

Abbreviations: BMI, body mass index; L, left; R, right.
study. In total, 328 (83.89%) patients were younger than 80 years and 63 (16.11%) were 80 years and older. Table 1 provides the demographic characteristics of both groups. No significant differences were found between groups in participants’ level of education ($P = .25$), marital status ($P = .06$), knee deformity type (varus or valgus) ($P = .31$), and prosthesis type (cruciate-retaining or posterior stabilized) ($P = .96$). The tibiofemoral axis (negative values for varus deformity and positive values for valgus deformity), which was assessed using a full-length, weight-bearing, anteroposterior radiograph of the lower limbs, showed significant preoperative differences between the groups (younger than 80 years, 7.8°; 80 years and older, 9.1°; $P = .05$). These differences were not significant in the postoperative period (younger than 80 years, 2.9°; 80 years and older, 3.2°; $P = .7$).

Table 2 provides a comparison of the standardized values from the SF-36 domains and summary scores for pre-, post-, and pre- and postoperative differences between groups. No significant differences were found in the domains for the preoperative assessment. Table 3 provides the postoperative minus preoperative values in the cognitive, functional, and symptomatic (pain) scores in both groups.

Comparison of pre- and postoperative values of the Short Portable Mental Status Questionnaire between groups was significantly different. The preoperative score was 0.29 for patients younger than 80 years and 0.69 for patients 80 years and older ($P = .001$), and the postoperative score was 0.19 for patients younger than 80 years and 0.55 for patients 80 years and older ($P = .002$). Significant differences were found between groups in preoperative KSS total (younger than 80 years, 101.7; 80 years and older, 92.5; $P = .01$) and KSS function (younger than 80 years, 54.7; 80 years and older, 47.8; $P = .007$) scores, but not for the KSS knee score. However, no significant postoperative differences were found in KSS total, knee, or function scores between groups ($P = .08, .7$, and .06, respectively). In contrast, although no significant differences were found in preoperative WOMAC scores between groups ($P = .97$), postoperative WOMAC scores were significantly different between groups (younger than 80 years, 20.55; 80 years and older, 22.7; $P = .05$). The pre- and postoperative visual analog scale for pain was not significantly different between groups ($P = .18$ and .38, respectively).

Surgical complications in terms of pre- or postoperative periprosthetic fractures, deep infection, or arthrofibrosis were not statistically different between groups ($P = .4$). Also, no significant differences in postoperative surgical wound complications were found between groups ($P = .6$). The mean±SD length of the hospital stay was
similar between groups: 8.3±0.8 days for patients younger than 80 years and 8.5±0.9 days for patients 80 years and older (P=.5).

Postoperative satisfaction with the surgical procedure was similar between groups (P=.16).

**Discussion**

Patients 80 years and older had a similar improvement in quality of life 1 year after TKA, except for worst physical function and role–emotional scores, compared with patients younger than 80 years. Although it has been previously demonstrated that older patients may benefit from TKA in terms of function, satisfaction, radiographic outcomes, and pain relief, the current study adds to the existing literature the fact that changes in quality of life also justify TKA in patients 80 years and older.

The results of the current study are comparable with previous studies in terms of function (KSS, WOMAC, and ROM) and pain relief.2–4 Many studies have also reported comparable results not only in function and pain relief, but also in satisfaction and radiographic outcomes between younger and older patients undergoing TKA.2–4,6,7 Therefore, based on the existing literature, the need for TKA in patients 80 years and older was justified. However, the comparison of quality of life between patients younger than 80 years and patients 80 years and older has not been well established. In a case series, Belmar et al8 reported improvement in quality of life after TKA in patients older than 90 years. However, the authors provided no further details on this aspect in the article. Therefore, no comparisons between the results of the current study and the one by Belmar et al8 can be performed. In addition, Belmar et al8 did not compare the outcomes of TKA with a sample of patients younger than 90 years. In contrast, Laskin6 reported a case control study that compared patients older and younger than 85 years for complications, function, and pain and found that quality of life was markedly increased. However, more details on quality of life were not provided.6

The results of the current study demonstrate that patients 80 years and older had lower scores for pre- and postoperative differences in physical function and role–emotional compared with those younger than 80 years. Although significant differences were found in the postoperative assessment for physical function, vitality, social function, and physical component summary, these differences were small, with scores differing by 6.2, 3.3, 2.6, and 4.3 points, respectively. Therefore, the increase of quality of life after TKA is similar between patient age groups. Consequently, TKA is recommended for elderly patients not only from a functional, radiographic, and pain relief point of view2–4,6,7 but also as a consideration in patients’ quality of life.

Quality of life improvement justifies TKA in patients 80 years and older. However, a cost-effectiveness analysis was not performed for the current study. The justification of any surgical procedure in an aging population is not only based on functional, symptomatic, quality of life, and radiographic outcomes, but also on an adequate relationship between the costs of TKA (considering inherent costs and those derived from complications) and the health effects. Zicat et al11 reported that TKA was cost-effective in patients 80 years and older. Although a cost-effectiveness analysis was not conducted in the current study, the length of hospital stay was almost equal in both groups, which may be an indirect estimate of costs.

The debate on the suitability of TKA in patients 80 years and older arose after some articles reported a higher incidence of complications in this age group.2–3,10 Three principal case control studies compared complications after TKA in patients older and younger than 80 years.2,4,11 Stroh et al2 reported that older patients had a significantly higher rate of medical but not surgical complications. Patients younger than 80 years had 4 surgical and 2 medical complications, whereas patients older than 80 years had 2 surgical and 13 medical complications (mostly urinary tract infection, arrhythmia, and delirium).2 In contrast, Zicat et al11 reported similar medical complications between both groups, but surgical complications occurred in 6% of patients in the octogenarian group and in 12% of younger patients. In the octogenarian group, 1 patellar revision for fracture, 1 patellar revision for ruptured patellar tendon, and 1 fusion of the knee for deep sepis were reported.11 However, inferential statistics for complications were not reported in these 2 studies. Similar to Zicat et al,4 Brander et al3 reported no significant differences in minor and major postoperative medical complications between patients older and younger than 80 years. Although medical complications

<table>
<thead>
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<th>Variable</th>
<th>Younger than 80 Years</th>
<th>80 Years and Older</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td>Pfeiffer scale</td>
<td>0.1±0.8</td>
<td>0.14±0.9</td>
<td>.8</td>
</tr>
<tr>
<td>KSS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>71.1±34</td>
<td>75.7±39</td>
<td>.3</td>
</tr>
<tr>
<td>Anatomic</td>
<td>43.1±21</td>
<td>43.7±21</td>
<td>.9</td>
</tr>
<tr>
<td>Function</td>
<td>28.3±20</td>
<td>32±20</td>
<td>.4</td>
</tr>
<tr>
<td>WOMAC</td>
<td>–27.5±16</td>
<td>–25.6±17</td>
<td>.6</td>
</tr>
<tr>
<td>VAS pain</td>
<td>–4.3±2.4</td>
<td>–4.2±2.4</td>
<td>.4</td>
</tr>
</tbody>
</table>

Abbreviations: KSS, Knee Society Score; VAS, visual analog scale; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index

Table 3

Post-Minus Preoperative Differences in Cognitive, Function, and Pain Scores
were not reported in the current study, the similarity between group length of hospital stay may indicate that no differences were found in these complications between patient age groups. As suggested by Stroh et al., the results of the current study demonstrated that patients 80 years and older have no significantly higher surgical complications compared with those younger than 80 years.

Preoperative functional limitations, severe pain, other comorbid conditions, and low mental health scores were associated with worse outcomes at 1- and 2-year follow-up. Nonetheless, comparison of cognitive status between patient age groups has not been well characterized. In the current study, the pre- and postoperative differences in the Short Portable Mental Status Questionnaire were not significantly different between groups. However, younger patients demonstrated significantly lower cognitive impairment in the pre- and postoperative comparisons. The differences in all 3 comparisons (pre-, post-, and pre- and postoperative differences) were small and most likely had no clinical significance. Also, values of the Short Portable Mental Status Questionnaire in these comparisons were high, demonstrating a low cognitive impairment in the sample as a whole.

Two limitations were found for this study. First, the follow-up of 1 year may be short compared with other studies reporting clinical and radiographic outcomes of TKA. However, it is not uncommon to have a follow-up of 1 year or less in studies focused on elderly patients. Assessing data on the quality of life of elderly patients 1 year after TKA is important in determining whether TKA may be beneficial to patients in this age group because worsening after such a short-term follow-up may seriously negate the use of this procedure, especially considering that life expectancy decreases with age. Second, the cognitive status was high in the sample as a whole, which may have incurred a selection bias by excluding patients with worst mental health from this procedure. Therefore, the results of the current study may only be applicable to patients with a good cognitive status.

CONCLUSION

Patients 80 years and older had similar improvement in quality of life 1 year after TKA compared with patients younger than 80 years. Therefore, changes in quality of life justify TKA as a treatment option for elderly patients with end-stage knee osteoarthritis.

REFERENCES