

Total Knee Arthroplasty in the Elderly. Is There an Age Limit?

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Abstract: The goal of this study was to compare the results of the total knee arthroplasty (TKA) in 2 study groups only differing by age. We have analyzed 218 TKA cases (138 women and 80 men) with at least 2 years follow-up. Mean age was 70 years (SD, 7.38 years; range, 43 to 98 years). An age cutoff point at 75 years defined the 2 study groups: 167 cases younger than 75 years and 51 older. Results were evaluated using the Hospital for Special Surgery Score. Mean score was raised from 53.43 (SD, 9.186) preoperatively to 85.57 (SD, 10.763) in 2 years follow-up ($P < .001$). The final score did not show significant differences between both groups (86.11 for the younger group and 83.8 for the older group). Differences in pain on walking, pain at rest, walk, range of motion, climbing stairs, transfer, muscle strength, or instability were not found between the patients younger and older than 75 years. We did not find any differences in TKA, functional score, or pain between the 2 studied groups. **Key words:** total knee arthroplasty, elderly patient, functional scores.

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The total knee arthroplasty (TKA) is one of the procedures that create greater expectations in patients, whom hope, pain, and deformity decrease, and physical and psychosocial functions increase. These perspectives are reached most of the time as the 3 months to 2 years postoperative follow-up shows frequently an improvement in the daily activities [1]. Even though TKA and total hip arthroplasty (THA) promote an improvement in quality of life, the first of them shows a better

differential increase, taking into account that the TKA patients' initial condition is worse than the THA ones [2].

Norman-Taylor et al [3] found a quality of life recovery in both procedures after the first year. Neither sex nor weight appeared as predictive factors, but age and location of arthroplasty (TKA/THA) were found as outcome predictive variables.

The age of TKA patients is inconstantly considered as an influential factor in the final result. Literature about the profit of this process in the elderly patient is heterogeneous. On the other hand, people with a good state of health and no previous knee or hip pathological processes do not show any functioning decreases as times goes on, and it does not seem ethical or socially acceptable to put across known TKA advantages taking into account only the age.

The objective of this work is to know if patient's age is a predictive factor of TKA outcomes, and if

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the elderly patients get the same improvement as other age range people with this procedure.

Materials and Methods

We have performed a descriptive observational follow-up study in a series of 218 cemented Interax TKA (Stryker, Inc, Limerick, Ireland) consecutively implanted in osteoarthritis of the knee. The follow-up period was 2 to 6 years, and the implant was carried out in 138 women and 80 men. Although the initial series consisted of 266 cases, 44 were excluded: 39 because of their incomplete questionnaire or unknown follow-up, 2 because of deep infection, and 3 because of component loosening. There were 26 bilateral cases, so the number of patients operated on was 192. Mean age was 70 years (range, 42-98 years).

Surgical decision was done when pharmacological and/or physical treatment followed for at least 6 months failed. All the patients were operated on by the same surgical unit with the proper experience and training for this kind of surgery. In 81 cases, we used posterior stabilized prostheses (by previous osteotomy, history of posttraumatic arthritis with posterior cruciate ligament rupture, or deformity varus-valgus $<15^\circ$). Postsurgical protocol was similar in all patients; walking was possible after 3 or 5 days with support and walking sticks. Physical therapy was immediately associated.

Clinical results about pain on walking and at rest, walking ability, and knee range of motion (ROM) were compared between initial situation and 2 years after the implant. Presurgical and postsurgical information was collected with a personal interview and clinical examination by a member of the unit who had not taken part in the surgery.

The data have been extracted from a computerized protocol including the Hospital for Special Surgery Score (HSS) questionnaire [4], among other clinical and radiographic data, with follow-up from preoperative clinical time, 1 month and 6 months after surgery and then annually. The HSS has 5 subgroups—pain on walking and at rest (30 points), function (including walking, climbing stairs, and transfer activity; 22 points), ROM (18 points), muscle strength (10 points), and flexion deformity or instability (20 points), so the best possible result reaches 100 points. Those knees with a rating of 85 or more were classified as excellent, 70 to 84 good result, and 60 to 69 fair result. Those knees that had a postoperative score of less than 60 were rated as failure. Incidence

of medical or surgical complications in the postoperative time was collected.

We used the SPSS software for Windows v 10 (SPSS, Chicago, Ill) for statistical analyses. χ^2 was used to compare qualitative variables. Student *t* test for independent samples was used to test the equality of means of quantitative variables. Mann-Whitney test was used when the distribution was not normal. The Kolmogorov-Smirnov test was used to test the normality of quantitative variables. The association between quantitative variables was measured with the Pearson correlation coefficient.

Results

Hospital for Special Surgery Score mean score was 53.43 (SD, 9.186) preoperatively and 85.57 (SD, 10.763) postoperatively ($P < .001$). The 63% of cases, which reached more than 85 points, were rated as excellent, 26% good, 5% fair, and 6% bad.

We considered 2 age groups using a cutoff point of 75 years: 167 were younger and 51 were 75 years or older. No significant difference was found between these 2 groups in frequency of posterior stabilized prostheses or previous surgery. Infection appeared only in 2 patients of the younger group. Component loosening appeared in 3 patients of the less than 75 years group. In the aged group, there were more medical complications: 2 urinary retention, 4 mental confusion, 2 gastrointestinal bleed, 3 cardiac alterations, and 5 of other complications. Wound disorders were more frequent in elderly patients (5.7%) than in the group younger than 75 years (4.7%).

The HSS ranges in both groups are shown in Fig. 1. The good and excellent results are similar in the 2 groups. The change of HSS score from

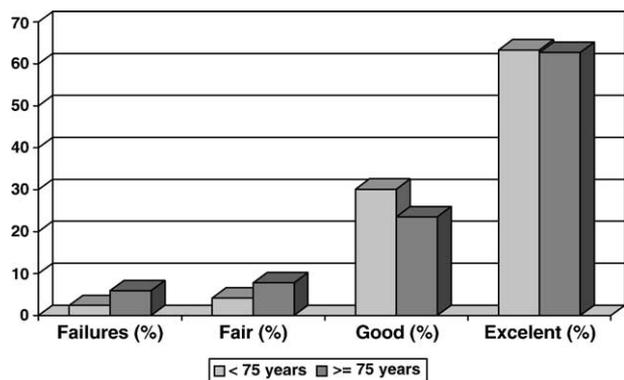


Fig. 1. Results in both groups according the HSS score.

Table 1. Score at 2 Years of the Surgery

Scoring category*	Overall series	Age <75 y (n = 167)	Age ≥ 75 y (n = 51)
Pain on walking (15)	13,01	13,1	12,72
Pain at rest (15)	13,81	14,02	13,14
Walking (12)	11,24	11,32	10,96
Climbing stairs (5)	3,63	3,64	3,61
Transfer activity (5)	4,16	4,18	4,08
ROM (18)	11,77	11,85	11,52
Muscle strength (10)	9,24	9,26	9,18
Flexion deformity (10)	9,40	9,41	9,35
Instability (10)	9,31	9,33	9,24
Total (100)	85,57	86,11	83,8

*The maximum possible score is indicated inside the parentheses.

preoperative time to 24 months after operation did not show significant statistical differences between groups (86.11 and 83.8, respectively) (Table 1). Differences in pain on walking, pain at rest, ROM, climbing stairs, transfer activity, muscular strength, or knee instability were not shown between the 2 groups. There was a better increase in ROM in the aged group, but statistical significance was not reached. We did not find a significant relationship between multiple regression for ROM at the 24-month follow-up as dependent variable, and preoperative ROM, age, sex, and weight as independent variables.

Discussion

The TKA is one of the procedures more common in orthopedic surgery, reaching an incidence of 60 per 100 000 inhabitants per year in industrialized countries [5]. Among surgical procedures, TKA is one of those that increased last year [6]. In Australia, and only in 5 years, the increase in the use of this technique has been of 42.8%, quite greater than the relative one to THA, which was increased only in 25.9%. In this country, the incidence of TKA by arthritis grew between 1994 and 1998 from 56.4 to 76.8 by 100 000 inhabitants a year [7]. There is an agreement in the literature about the good results obtained with this procedure and an agreement that the 90% of the patients can expect to preserve a satisfactory function 10 years after the surgery.

The questionnaire used by us evaluates the presence and intensity of pain, the practice of daily activities such as walking, climbing stairs, or transfer activity, and, in general, the well-being of the patient. Although it does not measure health-related quality of life as other specific question-

naires do, it includes some satisfaction and quality of life aspects.

A controversial topic in the literature on results of the TKA is the "old patient" definition. In the published series, the age limit fluctuates between the 75 and 90 years (Table 2). We have considered 75 years as an acceptable cutoff point between the full and the restricted activity because of social or personal circumstances.

Although the studies to verify the results of a TKA must be continued at least 10 years, the objective of our work has been to know if this therapeutic procedure modified the physical and functional situation of the elderly patient, which can be early evaluated, in agreement with other publications [19]. In our general series of TKA, we have observed that the improvement becomes stabilized in 6 months, and it is foreseeable that the score will not be modified after this time.

The advanced age had been a contraindication for TKA until the 1980s. Some reports about the utility of the procedure in the elderly were published, but less than 50 patients were included in the series. The group of aged patients constituted a small proportion in the general series of TKA, and it was generally thought to be indicated only in patients with severe limitations and exclusively for the reduction of pain [8,13,14,17,18].

Recent publications have led us to modify this opinion [9,19]. Laskin [16] studied the 62 TKA results in patients older than 85 years. This group represented the 3.8% of the global series (1631 patients). The 75% of the aged group needed the aid of a cane to walk after the intervention, whereas only the 18% of the younger patients required it. Nevertheless, almost all the patients of this aged group could make purchases of personal effects, lived independently,

Table 2. Minimum Age and Number of TKA Cases Analyzed in Some Series

Author	Minimum age	Cases
Adam and Noble [8]	75	40
Adili et al [9]	75	82
Belmar et al [10]	90	15
Birdsall et al [11]	80	119
Brander et al [12]	80	99
Cohn et al [13]	80	62
Hosick et al [14]	80	107
Joshi and Gill [15]	90	20
Laskin [16]	85	62
Tankersley and Hungerford [17]	85	20
Zicat et al [18]	80	50
Current study	75	51

or in senior retirement housing, and 30% of them were able to drive their own car. Birdsall et al [11] analyzed the health status of 119 patients with TKA over 80 years using the Nottingham Health Profile. They found significant improvement in the scores for pain, emotional reactions, sleeping, and physical mobility at 3 months.

Other authors [10,12,15] have established the security and effectiveness of TKA in patients older than 80. Complication rates and length of stay in acute care facilities were not significantly different between both groups.

Our work agrees with these findings, although the medical complications were more frequent in the aged group. Many of these complications were derived directly from the preoperative condition so they can be considered as predictive factors and would have to be recognized from the previous studies to allow aggressive treatment. Both age groups showed similar results at follow-up (Fig. 1). All the parameters of HSS improved in both groups without significant differences.

Although there are several works in the literature concerning this topic, we have not found anyone that compares the individual factors of the scores (pain, function, including walking, and ROM) between younger and older patients after a TKA. In our study, we have not observed differences in any of the analyzed parameters. Although statistical significance was not reached, even some factors such as ROM improved in older patients more than in the younger ones. The clinical improvement in walking, pain, and ROM after a TKA is not age related, so the advanced age should not be considered as a negative predictive factor.

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