

Survival of the AGC total knee arthroplasty is similar for arthrosis and rheumatoid arthritis

Finnish Arthroplasty Register report on 8 467 operations carried out between 1985 and 1999

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ABSTRACT We report the survival of AGC knee endoprosthesis from the Finnish Arthroplasty Register for 2 indications, osteoarthritis (OA, 6 306 knees) and rheumatoid arthritis (RA, 2 161 knees) during 1985–1999. Survivorship analysis was performed with revision as an endpoint. We found similar survival rates. In the OA group, survival after 5 years was 97% and it was 94% after 10 years. In the RA group the corresponding figures were 97% and 96%, respectively. There was no significant difference in survival whether or not cement was used for fixation. The revision rates were higher in men and in younger patients.

This report is based on data collected from the Finnish Arthroplasty Register, which is maintained by the National Agency for Medicines. The number of total knee arthroplasties (TKA) in Finland has increased during 1980–1999 from 295 to 4 380 operations per year, from 6/100 000 inhabitants to 85/100 000 (Nevalainen et al. 2000). During the same period, the number of hospitals performing TKA has risen from 19 to 64.

We report the survival of the AGC endoprosthesis which is used for the treatment of osteoarthritis (OA) and rheumatoid arthritis (RA). This was one of the commonest implants used in Finland during 1985–1999, which is when the data used in the cur-

rent study were collected. We evaluated the effect of different demographic and clinical variables.

Patients and methods

From 1985 through 1999, 8 467 primary AGC (Anatomically Gratuated Component, Biomet, Warsaw, IN, USA) knee arthroplasties were performed on 7 209 patients. Of these, 1 102 patients died during the study. The operations took place in 54 hospitals. The median number of operations per unit was 43 (1–1269). We performed Kaplan-Meier survivorship analysis with an endpoint of revision defined as removal, exchange or addition of a prosthetic component. We used the proportional hazard model and Log-Rank test to test the survival curves, with a significance level of 0.05.

Prosthetic survival was studied separately in patients with OA and in patients with RA. In the OA group, the number of knees operated was 6 306, and the corresponding figure in the RA group was 2 161. The follow-up averaged 3.2 (0–14) years in OA and 5.2 (0–15) years in RA. The mean age was higher in the OA group than in the RA group: 69 years for males and 71 years for females, compared to 60 and 61 years in the RA group (Table 1). We also analyzed the effect of cement fixation, and when the operation was performed.

Table 1. Patient demographics

	Osteoarthritis		Rheumatoid arthritis	
	Men / Women	Total	Men / Women	Total
Number of patients	1 254 / 4 216	5 470	332 / 1 407	1 739
Number of knees	1 435 / 4 871	6 306	404 / 1 757	2 161
Mean age in years (SD)	69 (8) / 71 (7)		60 (11) / 61 (13)	

Results

In the OA group, survival after 5 years was 97%, and after 10 years of follow-up it was 94%. In the RA group, the corresponding figures were 97% and 96%, respectively (Figures 1 and 2). In both groups, men had a higher cumulative revision rate than women. In the OA group, survival was 94% for women after 10 years, as compared to 93% for men ($p = 0.01$). In the RA group, the 10-year survival rates were 96% and 93%, respectively ($p = 0.004$) (Tables 2 and 3).

83% of the patients were over 60 years of age ($n = 6 984$). The 10-year survival rates were better among older patients ($p < 0.001$ for the OA group, $p = 0.007$ for the RA group). In patients with arthrosis, 10-year prosthetic survival was 95% for patients older than 60 years, and 85% for patients younger than this. In the RA group, the corresponding figures were 97% and 94%, respectively (Tables 2 and 3).

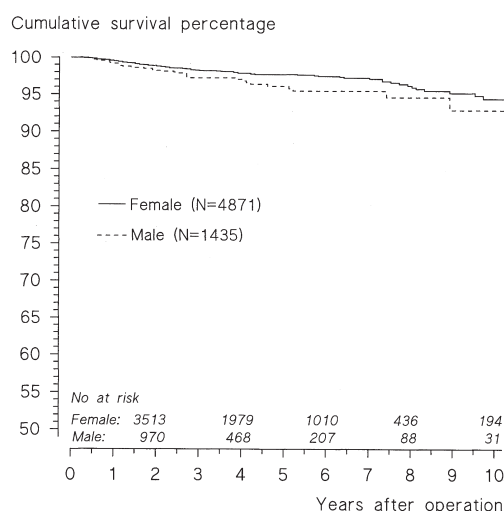


Figure 1. Cumulative survival in arthrosis patients.

In a proportional hazard model determining the effect of different variables on risk of loosening, diagnosis had no effect on the risk of loosening (relative risk (RR) = 1.25, 95% CI: 0.87–1.80, $p = 0.2$), nor had the use of cement (RR = 0.89, CI: 0.62–1.26, $p = 0.5$) or the time period of operation ($p = 0.4$). Gender and age were of importance: the relative risk for men was 1.66 (CI: 1.22–2.24, $p = 0.001$). With respect to the age factor, relative risk per year was 0.97 (CI: 0.96–1.26, $p = < 0.001$). Younger patients had a higher risk for revision (Table 4).

Discussion

In our study, and most other studies, comparing the long-term survival of the TKA in patients with RA and patients with OA, no significant differences between the groups have been found (Scuderi et al. 1989, Elke et al. 1995). Surprisingly, in their 12-

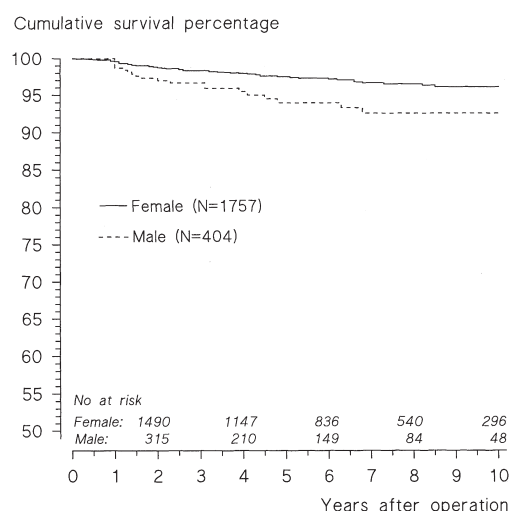


Figure 2. Cumulative survival in rheumatoid arthritis patients.

Table 2. Demographic and clinical variables, and prosthetic survival rates in osteoarthritis

Variable	n	5-year survival % (95% CI)	10-year survival % (95% CI)	P-value ^a
Sex				0.01
female	4 871	97.7 (97.1–98.2)	94.4 (92.3–96.0)	
male	1 435	96.1 (94.5–97.3)	92.9 (87.5–96.0)	
Age (years)				< 0.001
≤ 60	570	95.9 (93.3–97.5)	84.2 (72.6–91.2)	
> 60	5 736	97.5 (97.0–98.0)	95.3 (93.7–96.5)	
Cement				0.4
used	1 103	97.5 (96.8–98.0)	93.5 (87.6–96.6)	
not used	5 203	97.6 (95.9–98.0)	93.6 (91.6–95.6)	
Year of operation				0.6
1985–1989	252	98.3 (95.6–99.4)	95.1 (91.0–97.4)	
1990–1994	1 432	97.5 (96.5–98.2)	94.4 (91.9–96.2)	
1995–1999	4 622	97.2 (96.4–97.9)	–	

^a Log-Rank test for difference in survival curves between groups.

Table 3. Demographic and clinical variables, and prosthetic survival rates in rheumatoid arthritis

Variable	n	5-year survival % (95% CI)	10-year survival % (95% CI)	P-value ^a
Sex				0.004
female	1 757	97.5 (96.5–98.2)	96.1 (94.7–97.1)	
male	404	94.0 (90.4–96.2)	92.6 (88.4–95.3)	
Age (years)				0.007
≤ 60	913	95.8 (94.1–97.0)	93.9 (91.7–95.6)	
> 60	1 248	97.9 (96.7–98.6)	97.1 (95.6–98.1)	
Cement				0.5
used	827	97.0 (95.6–97.9)	96.5 (95.0–97.6)	
not used	1 334	96.9 (95.4–97.9)	94.9 (92.9–96.4)	
Year of operation				0.7
1985–1989	446	97.4 (95.3–98.5)	96.0 (93.5–97.5)	
1990–1994	845	97.0 (95.6–98.0)	95.7 (93.8–97.0)	
1995–1999	870	96.7 (94.6–97.9)	–	

^a Log-Rank test for difference in survival curves between groups.

Table 4. Proportional hazard model to determine the effect of variables on risk of loosening

Variable	Relative risk (95% CI)	P-value
Diagnosis (OA)	1.25 (0.87–1.80)	0.2
Sex (male)	1.66 (1.22–2.24)	0.001
Age (per year)	0.97 (0.96–0.99)	< 0.001
Cementing	0.89 (0.62–1.26)	0.5
Year of operation		0.4
1985–1989	1.00 (indicator)	
1990–1994	1.28 (0.81–2.03)	
1995–1999	1.47 (0.86–2.52)	

year follow-up, Nafei et al. (1996) reported 87% survivorship in patients with RA as compared to 97% survivorship in patients with OA. On the other hand, Rand and Ilstrup (1991) documented better survival rates in patients with RA than in patients with OA (83% vs. 80%) in a 10-year follow-up.

We found no difference in the survival of TKAs whether or not cement was used. The outcome of cemented and cementless arthroplasties has been discussed in many studies. Lybäck et al. (2000) documented 99% overall survival after up to 13 years of AGC knee endoprosthesis in juvenile

chronic arthritis, and found cementless fixation to be better. Nielsen et al. (1992) studied cementless fixation of AGC TKAs in unselected cases of OA and RA. Their results favored the use of cementless fixation, but the authors emphasized the importance of good fit of the tibial component. Bassett (1998) reported excellent clinical results with cementless fixation in the treatment of osteoarthrotic knees, and Nafei et al. (1996) observed a 92% overall survival rate for the cemented TKA at 12 years.

During the time period of 1980–1999, the 9-year-survival rate in the Finnish Arthroplasty Register was 93% for the 3 most used cemented knee prostheses in the OA group, and the 13-year-survival rate was 76% for the three most used uncemented endoprostheses. In RA, the 15-year-survival rate was 84% for the three most used cemented prostheses, and for the uncemented models the 14-year-survival rate was 82% (Nevalainen et al. 2000). Comparing AGC prostheses with the three models combined, AGC gave better survival rates. Although the AGC prostheses have an “old-fashioned” flat-on-flat design, the results can be considered to be good.

The most common indication for revision knee arthroplasty in 1999 in Finland was patellar complications (Nevalainen et al. 2000). Primary resurfacing can cause complications such as wear, patellar fractures and dislocation. Non-resurfacing, on the other hand, can lead to anterior knee pain, and finally to secondary resurfacing. Some studies have shown resurfacing to be better (Wood et al. 2002, Enis et al. 1990), but in some studies the outcome has been just the opposite (Bourne et al. 1995). The question of whether to resurface the patella or not in total knee arthroplasty is still unresolved. Our register study does not provide enough data to answer this question.

Our findings have similarities with the report from the Swedish Knee Arthroplasty Register of primary operations in patients with RA (1985–1995). Both in Finland and in Sweden, sex and age had an effect on prosthetic survival. Women and older patients (> 55 years) had better survival rates (Robertsson et al. 1997). The natural consequence of the ageing of the population is that the number of patients treated for OA is increasing with time (Knutson et al. 1994, Robertsson et al. 2000).

No competing interests declared.

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