Health outcome after total knee replacement in the very elderly

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Between 1992 and 1994 we performed a prospective study of the effect of total knee replacement (TKR) on the health status of 119 patients over the age of 80 years who had had a primary unilateral TKR.

The Nottingham Health Profile was used to assess this before and at three and 12 months after operation. We found a significant improvement in the scores for pain, emotional reaction, sleep and physical mobility at three months. After 12 months, the scores for pain and sleep were well maintained. The other factors had deteriorated slightly but remained better than before operation.

Our findings show that TKR leads to a significant improvement in the general health status of the very elderly.

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Total knee replacement (TKR) was introduced over 30 years ago. The results are reliable with excellent relief of pain and restoration of function.1,2 With this long-term success, the indications for surgery have widened to include very elderly patients such as those over 80 years of age.3-5 Advances in anaesthesia, general medical care and rehabilitation have made such surgery more suitable for these patients. Our aim in this study was to evaluate the effect of TKR on the health status of patients over 80 years of age.

Patients and Methods

In 1992, a prospective audit was begun in the Northern Region to assess the outcome of TKR. It was designed by CASPE Research in collaboration with participating surgeons. Four pilot sites were chosen: the Freeman Hospital, Newcastle upon Tyne, the Ashington General Hospital, the Dryburn Hospital, Durham and the South Tyneside District Hospital, South Shields. Later, it was expanded to include another 14 hospitals. The recruitment of patients ended in July 1994 at which time the database contained information on 2231 TKRs.

All patients undergoing this procedure were eligible for inclusion in the study and data were collected before and at three and 12 months after operation. The clinical details, indications for surgery, a clinical assessment and comorbidities were assessed before operation and subsequently any complications encountered were recorded together with a clinical and radiological assessment of the knee. The clinical evaluation was not blinded or independent and allowed the calculation of a number of clinical rating scores. Nottingham Health Profile (NHP) questionnaires were sent to all patients before and at three and 12 months after operation.

In the period of the study there were 223 patients over the age of 80 years who had had a primary TKR. Of these, 104 were excluded: 11 (5%) died before the one-year follow-up, 34 (15%) failed to complete the baseline assessment, 13 (6%) did not complete the NHP at three months and 46 (21%) at one year. For the remaining 119 a full set of records was available.

We randomly selected a gender-matched group of 119 younger patients aged between 65 and 75 years who also had a primary TKR thus allowing comparison between the very elderly and younger patients.

Outcome measures. We used part I of the NHP to assess the general health status before and after operation.6 This well-validated and reliable generic scale assesses general health across a number of dimensions, including physical, psychological and social functions. It is a questionnaire which is completed by the patient and has 38 items covering six subscales: pain, emotional reactions, sleep, physical mobility, energy and social isolation. Each is weighted to give a score out of 100, with greater ill-health giving a

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higher score. As with most measures of morbidity, NHP scores have been found to vary according to age and gender. The authors of the NHP no longer recommend the use of part II of the questionnaire and therefore this section was not used in our study.

We calculated median NHP values with the 25th and 75th percentiles for our two groups of patients. The mean difference between NHP scores was calculated with the standard errors.

**Statistical analysis.** We compared the NHP scores before and after operation for the two groups using the unpaired Student's $t$-test. The significance of differences before and after treatment was tested using the Wilcoxon matched-pairs test for non-parametric data.

**Results**

Figure 1 shows the NHP scores before and after operation for the very elderly patients. All dimensions of health, except social isolation, were substantially improved at three months after TKR ($p < 0.05$) and at 12 months, the improvement in energy, pain, emotional reactions, sleep and physical mobility was maintained ($p = 0.001$).

Figure 2 shows the NHP scores before and after TKR for the younger group of patients. This group also shows significant improvement in all dimensions, except social isolation, at three months ($p < 0.05$) which was maintained at 12 months.

Comparison of the NHP scores before operation for the two groups showed that the very elderly patients complained of less pain but worse mobility than the younger group ($p < 0.05$). At three months (Fig. 3), the younger group had greater improvement in the pain score than the elderly group ($p < 0.05$). At 12 months, the pain scores of both groups continued to improve.

The mortality rate for the very elderly patients in the 12 months after TKR was 5% (11 patients). The rate for the patients in the whole study was 1.8%. Within the general population in 1994, the annual death rate for the 80-to-84-year age group was 11.3% for men and 7.3% for women.

**Discussion**

Several studies have shown that very elderly patients derive significant benefit from TKR. We have addressed the effect of the procedure on the overall health of the patient.

Research into generic outcomes evaluates the impact of different treatments on individual patients. There are differing views on what constitutes a good outcome. Purchasers look at populations and their allocation of resources may be influenced by how alternative treatments are regarded.
The outcome of joint replacement surgery may be assessed in a number of ways, including measures of general health status, clinical ratings, rates of revision, complications, deaths, loosening, patient satisfaction, and adverse events (e.g., readmission). The distinction between measures of general health status and clinical rating scales depends on two main factors, the specificity of the measure and the assessor. Self-completed measures of general health status such as the NHP show the patient’s perspective of a broad range of factors. While this may be advantageous in assessing outcome from the point of view of the patients by avoiding observer bias, these techniques may also have disadvantages since the breadth of the measure can be influenced by factors other than those connected with the primary disease and/or replacement of the affected joint.

In our study the general health profile measured before operation using the NHP is clearly different from the normal scores for both groups of patients, indicating that arthritis of the knee has a significant effect on general health. The younger patients perceived their disability as being more severe and their pain worse (Fig. 4).

The group of very elderly patients showed improvement in all measurements except for social isolation at three months after TKR. At 12 months all these improvements were maintained, and the pain score improved still further. These patients were significantly better in terms of their general health after TKR.

Bias of selection by the surgeon is an important factor when considering results. In deciding to offer an operation the surgeon will prefer to choose the more healthy, mobile and co-operative patient.

Our study has shown that TKR leads to a significant improvement in the general health profile of the very elderly. Pain relief is excellent and well maintained at 12 months. No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References