Patellar resurfacing in total knee replacement: five-year clinical and economic results of a large randomized controlled trial

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study used data from a large randomised clinical trial to examine the cost-effectiveness of adding patellar resurfacing to primary total knee arthroplasty. The authors concluded that the addition of resurfacing did not affect the costs and the patient's functional and clinical outcomes, after five years. The cost-effectiveness framework was valid and the clinical trial was well conducted, but the cost information was not fully reported. The authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study used data from a large randomised clinical trial to examine the cost-effectiveness of adding patellar resurfacing to primary total knee arthroplasty.

Interventions
Patellar resurfacing was added to primary total knee arthroplasty and was compared with no patellar resurfacing.

Location/setting
UK/hospital.

Methods
Analytical approach:
This economic evaluation was based on and carried out alongside one trial. It had a five-year time horizon. The authors stated that it was carried out from the perspective of the health system.

Effectiveness data:
The clinical data were from a pragmatic, multicentre, partly factorial, randomised controlled trial; the Knee Arthroplasty Trial (KAT). Using computer-generated random numbers, patients were allocated to receive or not receive patellar resurfacing. Randomisation was stratified by surgeon, with minimisation for patient age, gender, and location of disease (one knee, both knees, or general arthritis). There were 861 patients in the patellar resurfacing group and 854 in the control group. The mean age was 70 years for both groups; 45% of patients were male in the resurfacing group and 44% were male in the control group. The length of follow-up was five years. In the control group, 95 patients received patellar resurfacing and in the resurfacing group, 138 did not receive it; an intention-to-treat analysis was performed. The primary endpoint was the functional status measured by the Oxford Knee Score (OKS). Power calculations were used to estimate the sample size needed to detect a significant difference in the primary outcome. Statistical analyses were carried out to account for baseline differences. Quality of life outcomes were reported, using tools such as the Short Form (SF-12) health survey and the European Quality of life (EQ-5D) questionnaire.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
No summary benefit measure was used. The primary endpoint was the change in the OKS.
Cost data:
The economic analysis included those costs associated with the hospital stay for primary arthroplasty and for any related readmissions, the operating theatre, knee arthroplasty components, blood transfusions, computed tomography or ultrasound, and knee-related consultations with general practitioners, physical therapists, and out-patient physicians. The quantities of resources were those used in the clinical trial or they were from the Hospital Episode Statistics database (England) or the Information Services Division (Scotland). The unit cost for knee components was from their manufacturers and other costs were from standard UK sources. All costs were in UK pounds sterling (£), for the year 2007 to 2008, and were discounted at an annual rate of 3.5%. Multiple imputation was used for missing data.

Analysis of uncertainty:
None reported.

Results
The mean total health care cost was £7,577 with patellar resurfacing and £7,726 without. This difference (-£149, 95% CI -574 to 277) in favour of resurfacing did not reach statistical significance (p=0.494). The cost of components was significantly higher with patellar resurfacing, but this was offset by a reduction in readmissions for major surgery.

Clinical, functional, and quality of life outcomes did not differ statistically between groups. After five years, the difference in the mean OKS between the groups was 0.59 points (95% CI -0.58 to 1.76). The difference in the EQ-5D was 0.01 (95% CI -0.02 to 0.4).

Authors’ conclusions
The authors concluded that the addition of resurfacing to primary total knee arthroplasty did not affect the costs and the patient’s functional and clinical outcomes, after five years.

CRD commentary
Interventions:
The selection of the comparators was appropriate as the proposed intervention was added to and compared with the usual total knee arthroplasty.

Effectiveness/benefits:
The clinical evidence came from a well-conducted clinical trial. The sample was large and its size was based on power calculations. An intention-to-treat analysis was performed and patients were included regardless of the treatment that they actually received. The authors stated that the two groups were well matched at baseline, reducing the potential for bias. Various measures were used to assess the clinical and functional impact of the two interventions. The patients were followed-up for a long time (five years) and multiple imputation for missing data was used and described. The trial was conducted in multiple centres, increasing its generalisability. The measurement of quality of life, as well as disease outcomes, was useful.

Costs:
The cost categories were appropriate for the stated perspective of the health system. The resource use was accurate as it was collected prospectively during the clinical trial using standard forms. The pragmatic nature of the trial aids the generalisation of these data to clinical practice. Little information on the sources of the unit costs was presented, but they appear to have been representative of the UK. Details such as the price year and discount rate were reported. Statistical analyses were conducted to assess the significance of the difference for each cost category.

Analysis and results:
The results were clearly presented. The costs and benefits were not synthesised as there were no statistically significant differences between groups; a cost-consequences analysis was carried out. The authors mentioned sensitivity analyses, but their methods and results were not reported. Strengths of the analysis were the large trial and its long follow-up. The transferability of the results was not discussed and the findings should be considered to be specific to the UK. The authors stated that a full economic evaluation would be conducted after eight years of follow-up.

Concluding remarks:
The cost-effectiveness framework was valid and the clinical trial was well conducted, but the cost information was not
fully reported. The authors’ conclusions appear to be robust.

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