Unicondylar knee arthroplasty in the UK National Health Service: an analysis of candidacy, outcome and cost efficacy
Willis-Owen CA, Brust K, Alsop H, Miraldo M, Cobb JP

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 compared the costs and functional benefits of unicondylar knee arthroplasty with those of total knee arthroplasty for all patients seeking knee arthroplasty. The authors concluded that unicondylar arthroplasty was cheaper than and functionally superior to total arthroplasty, and it should be considered unless it was contraindicated. These conclusions reflected the scope of the analysis, but more robust clinical evidence may be needed.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study assessed the proportion of patients needing a knee arthroplasty, who were candidates for unicondylar treatment, and it compared the costs and functional benefits of unicondylar versus total knee arthroplasty (TKA) for patients requiring arthroplasty.

Interventions
Unicondylar knee arthroplasty (UKA) has been used to treat degenerative arthritis and to manage unicompartmental disease. Initially there were variable results with UKA and TKA was the treatment of choice for these patients.

Location/setting
UK/primary care.

Methods
Analytical approach:
A two-arm decision tree was developed to compare the costs of UKA and TKA. The patterns of knee arthritis were assessed and classified, using radiography of 200 consecutive knees of patients booked for any knee arthroplasty at Charing Cross Hospital, London. The suitability for UKA was based on this classification and the functional benefits of UKA were from matched subgroups of all patients. The authors stated that the perspective was that of the hospital.

Effectiveness data:
The effectiveness data were from individual patients at Charing Cross Hospital. After the classification of the pattern of arthritis, using the preoperative radiographs, 20 sequential total arthroplasties were compared with 20 age- and sex-matched medial unicondylar arthroplasties, 20 age- and sex-matched lateral unicondylar arthroplasties, and 20 age- and sex-matched disease-free controls (upper-limb patients). Functional outcomes were assessed using the Total Knee Questionnaire (TKQ). Other outcomes of interest were the probabilities of success, revision surgery, and death with UKA and TKA, as well as the proportion of patients who were candidates for UKA.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
No summary measure of benefit was derived. Functional benefits were quantified using the TKQ. The relationship between the type of arthroplasty and knee function was examined for significance using analysis of variance.
Cost data:
The cost categories included surgery, hospital episodes, and revision surgery, with TKA and UKA procedures. Based on implant systems data from the UK National Joint Registry (NJR), surgery costs were obtained from the implant manufacturers and a weighted average of the most commonly used systems was calculated. The cost per day in hospital was based on figures provided by the management team at Charing Cross Hospital, London, combined with length-of-stay data from the UK NJR. Revision surgery costs were based on published material. The costs were reported in UK pounds sterling (£).

Analysis of uncertainty:
A two-way sensitivity analysis was performed on the revision and death probabilities, using ranges of values from those reported in the UK NJR to higher than those reported in registries from Finland and Australia.

Results
The overall cost was £2,543 for UKA and £4,304 for TKA, suggesting a saving of £1,761 with UKA compared with TKA. The composite of movement and life scores, and the total scores did not differ between UKA cases and controls, whereas TKA cases exhibited significantly lower scores.

The classification of arthritis patterns using radiographs suggested that 47.6% of patients were candidates for UKA.

The sensitivity analysis showed that UKA remained cheaper well beyond the range of published revision rates from the national joint registries.

Authors' conclusions
The authors concluded that unicondylar knee arthroplasty was cheaper than and functionally superior to total knee arthroplasty. Substantial savings in costs and human resources could be made, in the UK, if unicondylar arthroplasty was considered for each patient and total arthroplasty was only used where unicondylar treatment was contraindicated.

CRD commentary
Interventions:
The interventions were well described and relevant for the authors’ setting. The analysis compared the proposed UKA to TKA, which was the usual UK practice.

Effectiveness/benefits:
There was no indication that the authors conducted a systematic review of the literature to identify the clinical effectiveness estimates, so it is not clear if the best available evidence was used. This was a pragmatic evaluation using data specific to the authors institution. These data were well reported and were from a potentially good primary source. The classification was undertaken using appropriate blinding and the within-observer kappa statistic and between-observer score were both very high. The authors stated that the use of pre-operative radiographs alone to assess the suitability for UKA was limited and the resulting percentage was likely to be reduced if a clinical examination was made.

Costs:
The costs appear to have been consistent with the perspective and were well reported. The unit costs were from potentially good primary sources and the resource use was based on appropriate guidelines and studies. The price year was not reported, which will hamper reflation exercises.

Analysis and results:
The analytic approach was well reported, and the results were reported clearly and fully. The uncertainty was assessed to some extent: no probabilistic sensitivity analysis was performed and only one two-way sensitivity analysis was reported. The requirement for revision prosthesis was identified to vary case by case and it would have been useful to explore this in sensitivity analyses. It would also have been useful to explore the assumptions that surgery time, theatre consumables, and running time were equivalent for UKA and TKA.

Concluding remarks:
The study relied on observational data and whilst it was clearly and transparently reported, bias cannot be ruled out. The conclusions reflect the analysis undertaken, but more robust clinical evidence may be needed.

**Funding**
Not stated.

**Bibliographic details**

**PubMedID**
19464898

**DOI**
10.1016/j.knee.2009.04.006

**Original Paper URL**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Arthroplasty, Replacement, Knee /economics /instrumentation /mortality; Case-Control Studies; Cost-Benefit Analysis; Equipment Design /economics; Female; Great Britain /epidemiology; Humans; Knee Prosthesis /economics; Male; Osteoarthritis, Knee /economics /surgery; Reoperation /economics; State Medicine

**AccessionNumber**
22010000494

**Date bibliographic record published**
04/08/2010

**Date abstract record published**
08/06/2011