Cost analysis of primary total hip replacement

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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.

Health technology
Patients with arthritis were given a total hip replacement (THR) using the FC-2 implant (Howmedica, Limerick) with a standard Charnley cemented polyethylene cup (De Puy, Leeds). The comparator was no hip replacement. The patients were assessed before and after the hip replacement.

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
The study population comprised patients with arthritis undergoing a THR in one hospital.

Setting
The setting was secondary care. The economic study was carried out in Ireland.

Dates to which data relate
The effectiveness evidence and resource use data related to 1999. The price year was 1999.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The same patient sample provided both the effectiveness data and cost data.

Study sample
No power calculations to determine the sample size were reported. There was an unselected sample of consecutive patients. All 787 patients undergoing THR were included in the study.

Study design
This was a single-centre, within-group comparison study. Follow-up data were available for 144 patients at 1 year and for 67 patients at 2 years.
Analysis of effectiveness
The basis of the analysis was intention to treat. The primary health outcomes used were the Harris hip score, the Western Ontario and McMaster Osteoarthritis (WOMAC) index and the SF-36 questionnaire.

Effectiveness results
The Harris hip score went from 52.85 (standard deviation, SD=12.72) preoperatively to 87.98 (SD=11.43) at 1 year and 87.94 (SD=11.75) at 2 years.

The WOMAC index for pain went from 44.4 (SD=22.5) to 94.9 (SD 8.2) at 1 year and 94.9 (SD=13.6) at 2 years.

The WOMAC index for stiffness went from 41.7 (SD=23.9) preoperatively to 89.5 (SD=14.2) at 1 year and 91.0 (SD=11.9) at 2 years.

The WOMAC index for physical functioning went from 36.8 (SD=19.4) to 90.4 (SD=14.9) at 1 year and 91.1 (SD=16.6) at 2 years.

The SF-36 questionnaire showed improvements in all 8 components after 1 and 2 years. The biggest improvements were in:

- physical functioning, from 14.0 (SD=17.1) to 63.4 (SD=28.8) and 68.1 (SD=27.7);
- physical role limitations, from 9.19 (SD=24.5) to 84.9 (SD=34.8) and 86.3 (SD=32.4);
- social functioning, from 39.4 (SD=33.0) to 91.4 (SD=21.6) and 94.9 (SD=16.3); and
- bodily pain, from 28.1 (SD=22.5) to 84.4 (SD=23.1) and 88.1 (SD=18.1).

Clinical conclusions
The THR used on the patients in this study improved their physical health and their social functioning.

Measure of benefits used in the economic analysis
The measure of benefits used was the quality-adjusted life-years (QALYs). The authors stated that they used the overall SF-36 scores in conjunction with life expectancy to derive the QALYs, but they did not mention how the utility weights were derived.

Direct costs
Hospital costs were included in the analysis. The cost of a THR incurred by the hospital was broken down into salaries, materials, implant, medical equipment, laboratory and radiology costs, maintenance charges, provisions, housekeeping, administration, and miscellaneous costs. The costs were derived using actual data from the hospital and were measured in 1999. The costs after hospital discharge were not measured. Discounting was not carried out since the costs were incurred during less than 2 years. The costs were not broken down into prices and quantities. The price year was not stated but it was clearly 1999.

Statistical analysis of costs
No statistical analysis of the costs was carried out.

Indirect Costs
No indirect costs were measured.
Currency
Irish punts (IR).

Sensitivity analysis
No sensitivity analysis was carried out.

Estimated benefits used in the economic analysis
The gain in QALYs was not reported.

Cost results
The cost per THR was IR6,472.06. Only the hospital cost of the initial THR was calculated. The costs of readmissions and postoperative non-hospital costs were not included.

Synthesis of costs and benefits
The cost per QALY was IR1,863.55 for a man aged between 60 and 69 years, and IR1,467.27 for a woman of similar age. The corresponding costs per QALY for a man and woman aged between 70 and 79 were IR3,152.00 (man) and IR2,454.90 (woman), respectively.

Authors’ conclusions
Total hip replacement (THR) using the FC-2 implant with a standard Charnley cemented polyethylene cup represented good value for money for arthritis sufferers, as the cost per quality-adjusted life-year (QALY) was low compared with treatments accepted in other areas of medicine.

CRD COMMENTARY - Selection of comparators
The implicit justification for the comparator (no THR) was that it represented current practice in some settings. You should decide if the comparator represents current practice in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness data were obtained from a single-centre, within-group comparison study. This was not adequate for assessing the effect of THR, as it is important to assess patients not receiving THR over a comparable time interval since these patients will probably have deteriorated. The tools used to assess patient health and functioning were appropriate. The method used to measure the effectiveness will have underestimated the gain to patients. The study sample was representative of the study population since all patients receiving THR were included. The only way that the study population might not have been representative would be if arthritis patients in this part of Ireland were not representative of arthritis patients in other geographical areas. The number of patients providing follow-up data was too low to draw definite conclusions. The authors did not comment on this inadequacy.

Validity of estimate of measure of benefit
The measure of benefit (QALYs) was appropriate for the purposes of the study. The authors used the SF-36 scores in conjunction with life expectancy to calculate the QALY measures, but they did not mention how the utility weights were derived from the SF-36 scores. A method has been developed to derive utility weights from SF-36 scores, but the method used in this economic evaluation was not stated. The study design might well have underestimated the QALYs gained for the same reasons described already (see Validity of Measure of Effectiveness). The drawbacks of the inadequate follow-up data would also apply to the measure of benefit used.

Validity of estimate of costs
The cost categories included were consistent with the study perspective. The narrow coverage of the costs was explicit. No indirect costs were included. The cost boundary was hospital costs but not all of these were included. For example, any hospital costs resulting from readmission were not included. The authors also did not include the costs of readmission into hospital as a result of postoperative problems, and this will have underestimated the costs of THR. The costs and the quantities were not reported separately. The resource use came from a single study, while the unit costs came from the authors' setting. No statistical analysis of the prices or quantities was carried out. The price date was not reported, but it was likely to have been 1999.

**Other issues**
The authors compared their results with the findings from other studies and discussed the issue of generalisability to other settings. They presented their results in a fair and balanced way, but could have provided more data for the reader. The authors were aware that their definition of costs was very limited. Their conclusions largely reflected the scope of the analysis.

**Implications of the study**
The authors stated that the provision of THR should be encouraged as a worthwhile investment and efficient use of health resources.

**Source of funding**
None stated.

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