The economic benefit of hip replacement: a 5-year follow-up of costs and outcomes in the Exeter Primary Outcomes Study

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
To assess the cost-effectiveness of total hip replacement, using the Exeter implant, compared with no surgery. The authors concluded that, compared with no surgery, most patients received cost-effective treatment. The methods were reasonable, but there was no formal comparison group and there were numerous assumptions, making the results and conclusions uncertain.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of total hip replacement, using the Exeter implant, compared with no surgery.

Interventions
The Exeter prosthesis total hip replacement was compared with no hip replacement.

Location/setting
UK/in-patient secondary care.

Methods
Analytical approach:
The cost-effectiveness analysis was based on one clinical study, and had a time horizon of five years. The perspective was not explicitly reported.

Effectiveness data:
The clinical and effectiveness data were from the Exeter Primary Outcomes Study (EPOS), a longitudinal cohort study of the Exeter prosthesis undertaken in the UK. The EPOS collected data on 1,589 patients, of which 938 had sufficient data to be included in this study. These patients were followed-up for a minimum of five years. Due to a lack of a formal control group, the outcomes at five years were compared with those before the hip replacement. The main outcome measure was the quality of life as measured each year using the Short Form (SF-36) Health Survey.

Monetary benefit and utility valuations:
Responses to the SF-36 survey were converted into utilities, using a published algorithm (Brazier, et al. 2002, see 'Other Publications of Related Interest' below for bibliographic details).

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs) gained. The QALYs were compared with pre-operative baseline, using an area under the curve approach.

Cost data:
The authors reported that the direct costs included those of hospitalisation, Exeter implants, other components, and hip revisions. As no resource use data were collected in the EPOS study, the authors constructed a proxy cost per case in which the patient's length of stay was multiplied by the national variable cost per day. It was assumed that there was no
cost for no surgery. All costs were reported in UK £.

Analysis of uncertainty:
Multiple imputation methods were used for missing SF-36 estimates. Bias-corrected bootstrap methods were used to estimate 95% confidence intervals and multiple linear regression was used to model the QALY gains.

Results
Over five years the mean QALY gain with total hip replacement was 0.80 (95% CI 0.76 to 0.84). The median cost was £5,084 (interquartile range 4,588 to 5,812).

Compared with no surgery, the Exeter hip replacement was associated with an incremental cost per QALY gained of £7,182 (95% CI 6,740 to 7,678).

Over 85% of cases had a cost per QALY of £20,000 or less, with 70% of these having a cost per QALY of under £10,000.

Authors’ conclusions
The authors concluded that, compared with no surgery, most patients received cost-effective treatment.

CRD commentary
Interventions:
The interventions were described and usual practice was included in the analysis.

Effectiveness/benefits:
The clinical and effectiveness data were from the EPOS, which contained information on patients who had received a hip replacement, and had no control group. The patients’ outcomes at five years were compared with their assessments before hip replacement. It is likely that for many patients quality of life would have changed over five years due to increased age, the impact of other interventions, better coping mechanisms, or a combination of these. As a result, this before treatment group might not represent the outcomes of a formal control group.

Costs:
The perspective was not explicitly reported, and it was not possible to determine if all the relevant costs were included. The authors reported that no resource use data were collected and a retrospective analysis had to be completed, including the cost of hospitalisation, hip replacement, and revision surgery. They assumed that patients who had no surgery incurred no costs, but this is unlikely to be the case as patients would have received other interventions, such as pain medication or rehabilitation. The costs were incurred over five years, but it appears that no discounting of future costs was undertaken and the price year was not reported.

Analysis and results:
The clinical and outcome data were from one study. The impact of missing data on quality of life was appropriately assessed using multiple imputation methods. The authors reported 95% confidence intervals alongside the mean estimates. The authors reported that, due to the limitations of their study, the results should be treated with caution, and an alternative implant, rather than no surgery, would have made a more realistic comparison.

Concluding remarks:
The methods were reasonable, but there was no formal comparison group and there were numerous assumptions, making the results and conclusions uncertain.

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