Economic analysis of a randomized trial of percutaneous angioplasty, supervised exercise or combined treatment for intermittent claudication due to femoropopliteal arterial disease

Mazari FA, Khan JA, Carradice D, Samuel N, Gohil R, McCollum PT, Chetter IC

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 evaluated the cost-effectiveness of percutaneous transluminal angioplasty, a supervised exercise programme, and combined treatment for patients with intermittent claudication due to femoropopliteal atherosclerosis. The authors concluded that exercise was least expensive and should be the first treatment option. The study appears to have been well conducted. The cost and utility reporting was excellent, but the intervention detail and clinical outcome reporting were poor, and uncertainty in the cost-effectiveness ratio was not evaluated.

Type of economic evaluation
Cost-utility analysis

Study objective
This study evaluated the cost-effectiveness of percutaneous transluminal angioplasty, a supervised exercise programme, and combined treatment, for patients with intermittent claudication due to femoropopliteal atherosclerosis.

Interventions
Angioplasty, exercise, and angioplasty plus exercise were compared.

Location/setting
UK/secondary care.

Methods
Analytical approach:
The evaluation was based on a published randomised controlled trial (see Other Publications of Related Interest). The time horizon was the 12 months of the trial. The authors stated that it was conducted from a health care provider perspective.

Effectiveness data:
The clinical indicators of limb ischaemia were recorded at the start and at one, three, six and 12 months. Participants also completed the SF-36 Health Survey and the disease-specific Vascular Quality of Life Questionnaire (VascuQol).

Monetary benefit and utility valuations:
SF-36 scores were mapped to SF-6D preference-based utilities, using a published algorithm. The utility values were collected at all follow-up points.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the primary measure of benefit. They were calculated using the area under the curve.

Cost data:
Those costs common to each intervention were calculated for all settings, including: referral, follow-up, and attendance; pathology testing; treadmill testing, duplex scans, and electrocardiography; and drugs, such as aspirin, clopidogrel, and statins. Travel distance was calculated for all patients, averaged, and then multiplied by a standard mileage rate. The intervention and re-intervention costs were averaged, for each intervention, and added to the common and transport
costs to calculate the total costs. All costs were from UK NHS sources, at 2009 to 2010 prices. They were reported in Euros (EUR).

**Analysis of uncertainty:**
The QALYs were varied by substituting missing values with best, worst, median and initial values. An alternative method of calculating SF-6D utilities from the SF-36 was assessed. The costs were varied using values from private health care providers. The differences in outcomes and costs were compared for statistical significance.

**Results**
There were significant improvements in the clinical outcomes and quality of life for all three interventions, with no statistically significant differences between them. Patients receiving angioplasty plus exercise did not require re-intervention during the study follow-up. Nine patients in the angioplasty group required re-intervention, and six in the exercise group required re-intervention.

The costs for exercise were statistically significantly lower than those for angioplasty and for angioplasty plus exercise.

Exercise was less costly and more effective than angioplasty. Angioplasty plus exercise had an incremental cost-effectiveness ratio of EUR 152,260 per QALY gained, compared with exercise alone.

Sensitivity analyses indicated that altering the utility values did not change cost-effectiveness, but replacing diagnostic angiography with magnetic resonance angiography, in angioplasty and angioplasty plus exercise arms, and adding magnetic resonance angiography to exercise, reduced the incremental cost-effectiveness ratio for angioplasty plus exercise to EUR 67,977.50 per QALY gained.

**Authors’ conclusions**
The authors concluded that supervised exercise was least expensive and should be the first treatment for intermittent claudication. It should be offered to all patients undergoing angioplasty, as the combination was more cost-effective than angioplasty alone.

**CRD commentary**
**Interventions:**
The interventions were listed, but not described; two references for the trial were given (see Other Publications of Related Interest) and may contain further details. Other treatments may have been available, but were not assessed.

**Effectiveness/benefits:**
Few details of the trial methods were reported, but the references were given. The derivations for the effectiveness and utility data were clearly described. No results were reported for limb ischaemia, SF-36, or VascuQol, but the utility scores were reported. It was stated that all treatments resulted in statistically significant improvements, but these values were not reported. There was no adjustment for baseline utility.

**Costs:**
The costs were reported in excellent detail, with clear cost categories and resource use. The study was set in the UK, but the costs were reported in EUR instead of UK £, without reporting the conversion rate and the reason for conversion.

**Analysis and results:**
The results were clearly presented, with sufficient detail, and the conclusions logically followed from the results. The sensitivity analyses were limited. The authors tested different ways of imputing missing data for the QALYs. The amount of missing data was not reported, and none of the ways accounted for patient characteristics. Multiple imputation would have been better. The sensitivity analyses for the costs used alternative sources and were appropriate. Given the small differences between the effectiveness outcomes, a probabilistic sensitivity analysis would have been useful. The authors provided a thorough discussion of how their results compared with other evidence and they acknowledged the limitations of their study.

**Concluding remarks:**
The study appears to have been well conducted. The cost and utility reporting was excellent, but the intervention detail
and clinical outcome reporting were poor, and uncertainty in the cost-effectiveness ratio was not evaluated.

**Funding**
Not stated.

**Bibliographic details**

**PubMedID**
23842831

**DOI**
10.1002/bjs.9200

**Original Paper URL**

**Other publications of related interest**


**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Analysis of Variance; Angioplasty /economics; Combined Modality Therapy /economics; Cost-Benefit Analysis; Exercise Therapy /economics; Femoral Artery; Humans; Intermittent Claudication /economics /therapy; Popliteal Artery; Quality of Life; Quality-Adjusted Life Years; Treatment Outcome

**AccessionNumber**
22013027423

**Date bibliographic record published**
01/08/2013

**Date abstract record published**
10/12/2013