Revascularization for femoropopliteal disease: a decision and cost-effectiveness analysis

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
Revascularization for femoropopliteal disease.

Type of intervention
Secondary prevention.

Economic study type
Cost-utility analysis.

Study population
A hypothetical cohort of patients with chronic femoropopliteal disease who desire revascularisation.

Setting
Institution in the USA.

Dates to which data relate

Source of effectiveness data
Effectiveness data were derived from a review of previously completed studies.

Modelling
Decision analysis using a multistate transition simulation model (Markov process) was used.

Outcomes assessed in the review
The review assessed mortality and nonfatal systemic morbidity, the initial success of procedure, and five-year primary patency.

Study designs and other criteria for inclusion in the review
Not stated.

Sources searched to identify primary studies
Not stated.
Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
26 studies published after 1985, involving 4,800 angioplasty procedures and 4,511 bypass operations, were included in the review.

Methods of combining primary studies
Meta-analysis was used to combine the primary studies.

Investigation of differences between primary studies
The authors state that heterogeneity in case mix across studies was adjusted for in the pooling of results. Test results for heterogeneity on this or other factors were not reported.

Results of the review
The results estimated from the review were:

- overall mortality after angioplasty 0.9% (range: 0 - 7.4%),
- overall mortality after bypass 3.6% (range: 0.6 - 9.7%),
- overall nonfatal morbidity after angioplasty 1.3% (range: 0.2 - 11%),
- overall nonfatal morbidity after bypass 8.5% (range: 2.7 - 13%),
- initial success rate 94-100%,
- five year patency for angioplasty 7-73%,
- five year patency for bypass 22-87%.

Measure of benefits used in the economic analysis
Quality-adjusted life expectancy was used, and a Markov model was used to synthesise the results. Opinions from a panel of 5 physicians were used to value health states using the Torrance Multi-Attribute Scale.

Direct costs
Direct health service costs were considered. Mean hospital costs specified by procedure and indication were determined from 39 admissions for femoropopliteal PTA and 206 for femoropopliteal BS from 1985 to 1991. Costs for physician services (in and out of hospital), non-invasive testing during outpatient follow-up, amputation plus rehabilitation and annual costs for treatment after an amputation were based on published and unpublished charge data, using a collection to charge ratio. Costs for nursing care after an amputation came from the literature. Costs were expressed in 1990 dollars and discounted at 5% (range: 0 - 10%). Costs were reported separately from quantities.

Indirect Costs
Not included.
Currency
US dollars ($).

Sensitivity analysis
One-way and multi-way sensitivity analysis was performed on all angioplasty and bypass variables (mortality, complications, patency) and costs, including discounting of future costs and benefits.

Estimated benefits used in the economic analysis
The incremental benefits ranged from 2.7 to 7.4 years depending on the indication (i.e. claudication, rest pain, necrosis), lesion type (stenosis or occlusion), and graft type. Compared with a single treatment strategy, secondary treatment increased quality adjusted life expectancy by 9 to 24% for repeat angioplasty, by 9 to 100% for bypass following angioplasty, and by 3 to 18% for bypass. Benefits were estimated over the patient's lifetime.

Cost results
The cost of angioplasty for claudication was taken as $6,608 and for critical ischemia as $11,809. The cost of bypass surgery for claudication was taken as $13,343 and for critical ischemia as $16,820.

Synthesis of costs and benefits
For patients with a stenosis or with an occlusion and disabling claudication, initial angioplasty yielded greater effects compared with BS and always saved lifetime expenditures. For these patients, PTA-PTA always yielded greater effectiveness and was less expensive than no treatment but PTA-BS increased effectiveness even further for some. In patients with an occlusion and chronic critical ischemia, however, initial BS yielded the highest effectiveness and was either cost-saving or cost less than $2,000 per QALY gained compared with no treatment.

Authors' conclusions
Angioplasty is the preferred initial treatment in patients with disabling claudication and a femoropopliteal stenosis or occlusion and in those with chronic critical ischemia and a stenosis. Bypass surgery is the preferred initial treatment in patients with chronic critical ischemia and a femoropopliteal occlusion.

CRD Commentary
The authors acknowledged the limitations of this analysis such as the sparse and heterogeneous published data available and the assumptions required to model a complex clinical problem. The sensitivity analysis was thorough in that wide ranges were employed to test the assumptions made. The review of the literature was not well reported in that the databases searched were not reported and the inclusion criteria for studies was not stated. The choice of modelling approach was justified.

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