Completion angiography for surgically treated cerebral aneurysms: an economic analysis

Stein S C, Burnett M G, Zager E L, Riina H A, Sonnad S S

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 different strategies for completion angiography in patients who underwent cerebral aneurysm clipping. The authors concluded that routine intra-operative angiography after aneurysm clipping was the most cost-effective form of completion angiography. The details of the sources of the utilities could have been better reported. It was unclear whether the best available clinical and utility evidence was used, so the authors' conclusions should be considered with caution.

Type of economic evaluation
Cost-utility analysis

Study objective
This study evaluated the cost effectiveness of different strategies for completion angiography in patients who underwent cerebral aneurysm clipping.

Interventions
Routine intra-operative angiography (IA), performed immediately after clip placement, was compared with selective IA, routine post-operative angiography (PA), and no angiography.

Location/setting
USA/secondary care.

Methods
Analytical approach:
A multi-state time-dependent transition model was structured to simulate the course of patients undergoing aneurysm clipping. The time horizon was lifetime. The authors did not report the study perspective.

Effectiveness data:
The evidence was identified through a review of the literature, by searching MEDLINE and PubMed (Related Articles). The key clinical parameters were the probabilities of complications from clip aneurysm. The pooled transition probabilities were calculated mainly from a comprehensive review (Katz, et al. 2006, see 'Other Publications of Related Interest' below for bibliographic details).

Monetary benefit and utility valuations:
The utility estimates were obtained from the literature.

Measure of benefit:
The benefit measure was the number of quality-adjusted life-years (QALYs), which were discounted at 3% per year.

Cost data:
The cost categories included the costs of intra- or post-operative angiogram, elective re-clipping, admission, and clipping after re-bleed. Published Medicare and Medicaid reimbursements were used as proxies for these costs. All costs were reported in US dollars ($).

Analysis of uncertainty:
Univariate and two-way sensitivity analyses were performed on the major parameters. A Monte Carlo simulation was
also conducted using 1,000 trials of 1,000 patients to calculate the mean outcome, 95% confidence intervals, and incremental differences between the various angiography strategies.

Results
Routine IA had a total cost of $21,256 and 18.988 QALYs. Selective IA had a total cost of $28,936 and 18.917 QALYs. Routine PA had a total cost of $53,653 and 18.804 QALYs. No angiography had a total cost of $49,415 and 18.548 QALYs.

Routine IA was the most cost-effective, followed by selective IA, routine PA, and finally no angiography. Routine IA was slightly more cost-effective than selective IA. It was also dominant, as it was both less costly and more effective, therefore no incremental cost-effectiveness ratios were calculated.

In the sensitivity analysis, the parameters that had the greatest impact on the cost-effectiveness were the incidence and the reversibility of arterial compromise.

Authors' conclusions
The authors concluded that routine IA after aneurysm clipping was the most cost-effective form of completion angiography.

CRD commentary
Interventions:
The interventions were adequately described. All of the strategies appeared to be current practice.

Effectiveness/benefits:
The methods of the literature review were reported and the relevant references were provided, but the inclusion criteria and the details of these studies were not reported. The authors did not state why the Katz review was used for the clinical evidence. The sources used to obtain the utility estimates were given, but the instruments used and the sample populations were not reported.

Costs:
The perspective was not explicitly reported, so it is not clear whether the appropriate cost categories were included. The references for the sources of the cost data were presented. The authors did not report the price year nor the use of discounting.

Analysis and results:
The use of an incremental analysis was appropriate to determine the cost-effectiveness of the strategies. The authors investigated the impact of uncertainty through one-way sensitivity analyses, two-way sensitivity analyses, and Monte Carlo simulation. They highlighted the limitations of their model.

Concluding remarks:
The details of the sources of the utilities could have been better reported. It was unclear whether the best available clinical and utility evidence was used, so the authors' conclusions should be considered with caution.

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