Cost-effectiveness of pegaptanib compared to photodynamic therapy with verteporfin and to standard care in the treatment of subfoveal wet age-related macular degeneration in Canada

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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.

CRD summary
This study evaluated the cost-effectiveness of pegaptanib compared with photodynamic therapy using verteporfin and with standard care, in elderly patients with subfoveal, wet, age-related macular degeneration. The authors concluded that, in Canada, pegaptanib was a cost-effective treatment regardless of lesion subtype, compared with either photodynamic therapy using verteporfin or with standard care. There were a few limitations to the study and the authors' conclusions should be considered with caution.

Type of economic evaluation
Cost-utility analysis

Study objective
The aim was to evaluate the cost-effectiveness of pegaptanib compared with photodynamic therapy using verteporfin and compared with standard care in elderly patients with subfoveal wet age-related macular degeneration (AMD).

Interventions
Pegaptanib, a vascular endothelial growth factor antagonist, which was approved for all forms of subfoveal wet AMD, was compared against conventional treatment. Conventional treatment included thermal laser photocoagulation, and photodynamic therapy using verteporfin.

Location/setting
Canada/secondary care.

Methods
Analytical approach:
A Markov model was developed to synthesise the data. The authors stated that the perspective was that of a provincial Ministry of Health in Canada. The model had a lifetime horizon and modelled two years of treatment. The population was stratified by age group (65 to 74 years and over 74 years), gender, and lesion subtype (occult, minimally classic, or predominantly classic).

Effectiveness data:
The evidence came from clinical trials that appear to have been recent and relevant. The literature search was partially described. The methods used to derive the clinical estimates, where there were no available direct comparisons between arms, were described. The main effectiveness parameter was related to visual acuity.

Monetary benefit and utility valuations:
Visual acuity in the better eye was valued and the authors cited a paper that used time trade-off and standard gamble methods to elicit the utilities related to visual acuity.

Measure of benefit:
The measures of benefit were vision-years gained and quality-adjusted life-years (QALYs). A 3% discount rate was applied for benefits.

Cost data:
The cost categories included the treatment comparators, comorbidities (depression, fractures, and need for assisted living), vision rehabilitation, visual aids, and adverse events. The sources included the clinical trials, provincial fees at Quebec, experts (for adverse event management), and a provincial database. The costs were reported in 2004 Canadian dollars (CAD), and discounted at an annual rate of 3%.

Analysis of uncertainty:
Several one-way and scenario sensitivity analyses were performed evaluating alternative time horizons, resource use and costs for comorbidities, relationship of vision loss to mortality, treatment costs, AMD subtype prevalences, continuing treatment after reaching legal blindness, patient age, discount rate, and utilities.

Results
Mean vision-years gained were 3.83 for pegaptanib, 3.26 for standard care, and 3.01 for photodynamic therapy. The QALYs gained were 4.17 for pegaptanib, 3.96 for standard care, and 3.87 for photodynamic therapy. The mean total costs were CAD 20,016 for pegaptanib, CAD 7,669 for standard care, and CAD 15,345 for photodynamic therapy.

The incremental cost per QALY for pegaptanib was CAD 49,052 over photodynamic therapy and CAD 59,039 over standard care. The incremental cost per vision-year gained for pegaptanib was CAD 20,401 over photodynamic therapy and CAD 21,559 over standard care.

The model was relatively robust to the sensitivity analyses undertaken, being most sensitive to changes in the time horizon and the discount rates.

Authors’ conclusions
The authors concluded that, in Canada, pegaptanib was a cost-effective treatment for subfoveal wet AMD, in elderly patients regardless of lesion subtype, compared with both photodynamic therapy using verteporfin and standard care.

CRD commentary
Interventions:
The authors clearly described the interventions, which appeared to be relevant to the health problem evaluated. They reported that photodynamic therapy had not been approved for minimally classic and occult lesion subtypes, which could have made pegaptanib less cost-effective.

Effectiveness/benefits:
No clear systematic literature search was reported, which makes it difficult to ascertain if the best available evidence was used. Randomised controlled trials as sources for the effectiveness data were appropriate given the strengths of their design, but more details on them would have been helpful. As no direct comparison between photodynamic therapy and pegaptanib was available, the authors extrapolated their effects from different clinical trials.

Costs:
All the costs relevant to the perspective adopted appear to have been included, and their sources appear to have been appropriate. The authors stated that this was one of the few studies that formally included AMD-related comorbidity costs.

Analysis and results:
The authors stated that pegaptanib was cost-effective, but they did not state the threshold that a drug was considered to be cost-effective in Canada. Rather than comparing the three interventions together, they produced pairwise comparisons of pegaptanib with the other two therapies. They also did not point out that photodynamic therapy was a dominated strategy. The authors compared their results with those from other studies, which appeared to have different conclusions. Only one-way sensitivity analysis was performed, which limits the evaluation of the overall parameter uncertainty. The issue of generalisability was not directly addressed. The authors also stated the limitation that the age of the trial patients was different from that of their modelled cohort.

Concluding remarks:
There were a few limitations to the study and the authors’ conclusions should be considered with caution.
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