Cost-effectiveness analysis of ranibizumab versus verteporfin photodynamic therapy, pegaptanib sodium, and best supportive care for the treatment of age-related macular degeneration in Greece

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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
The aim was to assess the cost-effectiveness of ranibizumab, compared with best supportive care, verteporfin photodynamic therapy, and pegaptanib, for the treatment of age-related macular degeneration in Greece. The authors concluded that ranibizumab was cost-effective, compared with selected therapies. There were some limitations to the methods and reporting, and the authors’ conclusions should be considered with caution.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The aim was to assess the cost-effectiveness of ranibizumab, compared with best supportive care, verteporfin photodynamic therapy, and pegaptanib, for the treatment of age-related macular degeneration in Greece.

Interventions
The four interventions were ranibizumab, best supportive care, verteporfin photodynamic therapy, and pegaptanib. Ranibizumab was given for eight injections in the first year and six injections in the second year. Best supportive care was defined as two consultations with an ophthalmologist and one optical coherence tomography per year. Three types of lesion were considered; minimally classic, occult, and predominantly classic.

Location/setting
Greece/secondary care.

Methods
Analytical approach:
The authors constructed a Markov model to synthesise the data from the published literature. The model consisted of five visual acuity health states, defined according to the Snellen scale, and death. The time horizon was 10 years. The authors stated that the study perspective was that of the third-party payer, which was the Greek Social Insurance Sickness Fund.

Effectiveness data:
The clinical evidence came from the published literature, including two randomised controlled trials, one of which directly compared ranibizumab with best supportive care and the other compared ranibizumab with photodynamic therapy. An indirect comparison was used for pegaptanib and best supportive care, based on the relative risks from a published study applied to the comparator arms in the ranibizumab trials. The primary clinical effectiveness estimate was the improvement in visual acuity, which was based on the clinical trial data.

Monetary benefit and utility valuations:
The utility values came from a published study that used the time trade-off technique.

Measure of benefit:
The summary benefit measures were quality-adjusted life-years (QALYs) and vision-years, meaning the years with better than 20 out of 200 visual acuity.
Cost data:
The direct costs included the cost of ophthalmic care, the treatment of blindness, and drugs. The resource use estimates were from a panel of 10 Greek health service experts in ophthalmology, and these frequencies of resource use were multiplied by the unit costs from the Greek National Health Insurance Fund, 2011. All costs were presented in Euros (EUR) and the price year was 2011. An annual discount rate of 3.5% was applied to future costs.

Analysis of uncertainty:
The overall parameter uncertainty was assessed in a probabilistic sensitivity analysis and the results were presented in cost-effectiveness acceptability curves.

Results
The mean QALYs in patients with predominantly classic lesions were 4.49 with ranibizumab, 4.27 with photodynamic therapy, 4.21 with best supportive care, and 4.30 with pegaptanib. The mean vision-years in patients with predominantly classic lesions were 2.98 with ranibizumab, 1.69 with photodynamic therapy, 1.48 with best supportive care, and 2.16 with pegaptanib.

The mean cost in patients with predominantly classic lesions was EUR 31,751 with ranibizumab, EUR 30,497 with photodynamic therapy, EUR 28,372 with best supportive care, and EUR 31,864 with pegaptanib.

Ranibizumab dominated pegaptanib, as it was less costly and more effective. The incremental cost per QALY gained with ranibizumab was EUR 6,444 compared with photodynamic therapy and EUR 15,334 compared with best supportive care. The incremental cost per vision-year gained with ranibizumab was EUR 1,015 compared with photodynamic therapy and EUR 2,289 compared with best supportive care.

These results were robust in the sensitivity analyses; most of the incremental cost-effectiveness ratios were below the willingness-to-pay threshold of EUR 30,000 per QALY gained, for all types of lesion.

Authors’ conclusions
The authors concluded that ranibizumab was cost-effective, compared with selected therapies, for age-related macular degeneration, in the Greek setting.

CRD commentary
Interventions:
The interventions were listed, but not described, and they may or may not reflect practice in other settings. It was unclear whether all relevant comparators were included, and the authors’ conclusions suggest that there were other options.

Effectiveness/benefits:
The authors did not provide detailed information on the sources of the clinical evidence, such as the study protocols, sample sizes, and follow-up periods. It was unclear which sources were searched, what the inclusion criteria were, and what methods were used to derive the clinical estimates. The time trade-off method was used to estimate the utility values, but it was unclear whose preferences were elicited and therefore whether they were appropriate for calculating the QALYs.

Costs:
The authors included relevant costs for the stated perspective and they described the methods used to estimate the resource use. They did not describe how they had searched for other sources of data and it is unclear whether the best available data were used. The sources for the prices used to calculate costs were appropriate to the study setting and the authors correctly discounted future costs.

Analysis and results:
An incremental approach was appropriate for comparing the relative cost-effectiveness of a range of different treatment options, and the authors used appropriate methods to assess the impact of uncertainty on the results. The reporting was generally limited, particularly for the effectiveness and benefit measures, and the generalisability of results is unclear. The authors discussed some of the limitations to their study, including the lack of Greek data.
Concluding remarks:
There were some limitations to the methods and reporting, and the authors’ conclusions should be considered with caution.

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