Verteporfin photodynamic therapy cohort study. Report 3: Cost effectiveness and lessons for future evaluations

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 examined the cost-effectiveness of verteporfin photodynamic therapy (VPDT) for the routine treatment of neovascular age-related macular degeneration, compared with best supportive care, over a two-year time horizon. The authors concluded that VPDT was not likely to be cost-effective, from the perspective of health and social services. The study was satisfactorily carried out and the authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of verteporfin photodynamic therapy (VPDT) for neovascular age-related macular degeneration (nAMD) compared with best supportive care. The aim was to overcome some issues, in previous economic evaluations, that related to the quality of life estimates and costs.

Interventions
VPDT was compared with best supportive care, which did not include active treatments, such as anti-vascular endothelial growth factor.

Location/setting
UK/primary and secondary care.

Methods
Analytical approach:
The cost-effectiveness analysis used an analytic model that specifically assessed the relationship between best-corrected visual acuity and health and social services costs. A two-year time horizon was considered and the authors stated that the analysis was carried out from the perspective of health and social services.

Effectiveness data:
Most of the clinical evidence came from two relevant studies, which were the Treatment of Age-Related Macular Degeneration with Photodynamic Therapy (TAP) trial and the VPDT Cohort Study (Harding, et al. 2009, see ‘Other Publications of Related Interest’ below for bibliographic details). The cohort study enrolled patients attending 45 clinical sites, for the treatment of nAMD, in a routine setting, using VPDT. The primary endpoint was the change in best-corrected visual acuity with VPDT and these data were from the TAP trial.

Monetary benefit and utility valuations:
The utility values were derived from the VPDT Cohort Study. This assessed the relationship between the decline in best-corrected visual acuity and the reduction in Short Form (SF-6D) Health Survey scores. The preference weights were from the general population.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and they were discounted at a rate of 3.5% during the second year.
Cost data:
The economic analysis considered the costs of verteporfin, treatment and follow-up visits, tests (photography and fluorescein angiography), best supportive care (vision assessments), and vision loss (unscheduled low-vision appointments, antidepressants, visits to general practitioners, visits from social services, and time in nursing homes, residential care, or sheltered housing). The treatment resources were mainly derived from the VPDT Cohort Study. The cost of verteporfin was from the British National Formulary and excluded value added tax. The costs of visits were National Health Service (NHS) reference costs and the costs of vision loss were from the VPDT Cohort Study, which gathered data every six months for a subsample of 15 sites, using a questionnaire. National cost data were used for these items. The costs were reported in both UK pounds sterling (£) and US dollars ($), for the price year of 2007. Those incurred in the second year were discounted at a rate of 3.5%.

Analysis of uncertainty:
A probabilistic sensitivity analysis was undertaken to consider the sampling uncertainty in the key parameters, such as the best-corrected visual acuity, the association between this and quality of life, intervention costs, and the association between the best-corrected visual acuity and health and social services costs. Various scenarios, with alternative assumptions, were also considered.

Results
The incremental costs with verteporfin over best supportive care were £3,514 ($5,276) and the QALYs gained were 0.02071. The incremental cost per QALY gained was £170,000 ($255,000).

The sensitivity analysis proved that the base case findings were robust to changes in the key inputs. The probabilistic analysis showed that, below a threshold of £100,000 per QALY, there was no chance of verteporfin therapy being cost-effective.

Authors' conclusions
The authors concluded that VPDT was not likely to be a cost-effective treatment for nAMD.

CRD commentary
Interventions:
The selection of the comparators was appropriate as the proposed intervention was compared with the conservative approach for patients with nAMD. The authors pointed out that anti-vascular endothelial growth factor might have been the usual care in some settings, where it would have been the most appropriate comparator.

Effectiveness/benefits:
The clinical side of the study was only partly reported. The authors presented most of the assumptions, but the details of the two key data sources were not provided. A randomised controlled trial is generally considered to be a valid source of evidence, due to the strengths of its design, but more details would have been useful for an assessment of the quality of the data. Some data were from the VPDT Cohort Study and its key characteristics were published elsewhere. QALYs were a valid benefit measure, given the impact of the disease on health-related quality of life. They also allow comparisons to be made with the benefits of other health care interventions. The authors stated that using utility weights from the general population overcame some issues with previous studies that used patient utilities, which overestimated the relationship between best-corrected visual acuity and the quality of life.

Costs:
The economic side of the study was well carried out. The costs were consistent with the perspective, but limited details of the unit costs and resource quantities were reported. The use of detailed resource use data for all patients from the VPDT Cohort Study accurately reflected routine clinical practice. The costs and assumptions were varied in the sensitivity analysis. The price year, currency conversion, data sources, and use of discounting were clearly reported.

Analysis and results:
The results were clearly presented and the costs and benefits were appropriately synthesised in an incremental analysis. The issue of uncertainty was satisfactorily investigated and reported, using both probabilistic and deterministic methods. These results should be considered to be specific to the UK and it is not clear whether they could be
transferred to other settings. A good feature of this analysis, compared with other published economic analyses, was the use of a large cohort of patients from several practices.

**Concluding remarks:**
The study was satisfactorily carried out and the authors’ conclusions appear to be robust.

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