Ranibizumab versus bevacizumab to treat neovascular age-related macular degeneration: one-year findings from the IVAN randomized trial


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 compare the costs and effectiveness of ranibizumab and bevacizumab for the treatment of neovascular age-related macular degeneration. The authors concluded that ranibizumab and bevacizumab were equally effective, but bevacizumab was much cheaper. The methods seem to have been appropriate and clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to compare the costs and effectiveness of ranibizumab and bevacizumab for the treatment of neovascular age-related macular degeneration.

Interventions
The analysis included four combinations of the two treatments. Intravitreal injections of ranibizumab 0.5mg or bevacizumab 1.25mg were administered continuously (monthly attendance) or for as long as needed (monthly for three treatments, with a further three months as needed).

Location/setting
UK/secondary care.

Methods
Analytical approach:
The cost-effectiveness analysis was based on a clinical trial. The authors stated that the perspective was that of the UK NHS and the time horizon was one year.

Effectiveness data:
The effectiveness data were primarily from a randomised trial of 628 adults aged 50 years or older, with previously untreated neovascular age-related macular degeneration in the eye, with best corrected visual acuity of 25 letters or more on the Early Treatment Diabetic Retinopathy Study Chart. Patients were randomised to receive either ranibizumab or bevacizumab. The trial was conducted recently in many centres and had a factorial, non inferiority, randomised design. The primary measure of effectiveness was visual acuity. Health-related quality of life was measured using the European Quality of life (EQ-5D) questionnaire.

Monetary benefit and utility valuations:
Not applicable.

Measure of benefit:
The primary clinical outcome was visual acuity at one year. Adverse effects were recorded.

Cost data:
The cost categories were the costs of drugs, concomitant medications, hospitalisations, consultations in primary care, and tests. The data were collected using participant questionnaires during the trial and were valued using national
sources, such as the British National Formulary, the Personal Social Services Research Unit, the Department of Health. Ranibizumab was valued at UK list price and the manufacturer price from the trial was used for bevacizumab. The price year was 2010 to 2011 and the currency was UK £.

Analysis of uncertainty:
The authors used bootstrapping to evaluate the uncertainty around the results. They conducted a meta-analysis to combine the effectiveness estimates from their trial with those of a previous trial of the same comparators.

Results
The comparison of the effectiveness of ranibizumab and bevacizumab was inconclusive. The difference in visual acuity (bevacizumab minus ranibizumab) was -1.99 letters with a 95% confidence interval of -4.04 letters to 0.06 letters.

The total annual costs of ranibizumab were estimated to be £9,656 compared with £1,654 for bevacizumab, when used continually, or £6,398 for ranibizumab and £1,509 for bevacizumab, when used as necessary. The additional cost of ranibizumab was £8,001 for continuous use or £4,889 for discontinuous use.

On the basis of 17,295 eyes being treated annually, using ranibizumab rather than bevacizumab could save the NHS £84.5 million annually.

Authors' conclusions
The authors concluded that ranibizumab and bevacizumab were equally effective, but bevacizumab was much cheaper.

CRD commentary
Interventions:
The interventions were clearly reported and were relevant to the study setting. There might have been other relevant treatments.

Effectiveness/benefits:
The source for the effectiveness data was described in detail and this study had a good design. The authors also conducted a meta-analysis for the primary outcome, including the results of the source trial, which enhances the confidence that the best available evidence was considered. The relevant outcomes, including adverse events, appear to have been reported.

Costs:
The costs were relevant to the stated perspective. The measurement of the resources was appropriate, but there was potential for recall bias and error, which could affect the validity of these estimates. The cost data were appropriate for the study setting and the authors provided the price year. The short time horizon (one year) of the analysis meant that it was appropriate for the authors not to use any discounting.

Analysis and results:
The authors used an appropriate approach to analyse the data from the well-designed study. The impact of uncertainty was assessed appropriately, but modelling over a longer time horizon and synthesising other estimates from published literature could have produced a more comprehensive analysis. The reporting was generally good and the authors acknowledged a number of key limitations.

Concluding remarks:
The methods seem to have been appropriate and clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.

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