Latanoprost versus timolol as first choice therapy in patients with ocular hypertension

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Record Status
This is an economic evaluation that meets the criteria for inclusion on NHS EED.

CRD summary
The study examined the cost-effectiveness of first-line treatment with either latanoprost or timolol for the management of ocular hypertension. The authors concluded that treatment starting with latanoprost was not cost-effective compared with treatment starting with timolol because of small differences in health benefits and the high price of latanoprost. The analysis was based on a valid modelling framework. The authors’ conclusions appear robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study examined the cost-effectiveness of first-line treatment with either latanoprost or timolol for the management of ocular hypertension.

Interventions
Treatment starting with latanoprost was compared with treatment starting with timolol. Further lines of treatment included monotherapy, combination therapy, and laser trabeculoplasty. Four drugs (representing major generic classes) were used: timolol (beta-blockers), latanoprost (hypotensive lipids), brimonidine (alpha2-adrenergic agonists), and dorzolamide (topical carbonic anhydrase inhibitors). Patients could switch between treatments if there were side effects or limited treatment effect.

Location/setting
The Netherlands/secondary care.

Methods
Analytical approach:
The analysis was based on a two-part decision model. The first part was a decision tree that covered the first 15 months of therapy, which used a Monte Carlo simulation to sample age and initial intraocular pressure of the patient cohort. The second part was a Markov model with six-month cycles that was applied to cover the rest of patients’ lives (given the overall lifetime horizon of the analysis). The authors stated that the perspective of the health care system was adopted.

Effectiveness data:
A selective approach appeared to have been used to identify relevant sources of data. Published systematic reviews were used whenever possible. Meta-analyses were used for treatment effect of all four drugs under analysis. Side effects were from several published studies not described. Patient characteristics came from a database of 1,000 charts of patients visiting a non-referral general ophthalmic practice in Maastricht. Changes in intraocular pressure values were the key inputs of the model; these were from the meta-analyses.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
Years of blindness were used as the summary benefit measure and were defined as the mean expected time spent in blindness per person within 18.7 years of life expectancy. A 4% annual discount rate was applied.

Cost data:
The analysis included the costs of drugs, outpatient visits, perimetry, laser, transportation, and glaucoma therapy.
Economic data were from various sources including official price lists, hospital databases, and previous published studies. Patterns of resource consumption were based on specialists’ opinion and the recommendations of the American Academy of Ophthalmology. Costs were in Euros (EUR). The price year was 2003. A 4% annual discount rate was applied.

**Analysis of uncertainty:**
One-way sensitivity analyses were carried out to vary key inputs of the model such as side effects of medication, cost of glaucoma therapy, and cost of latanoprost. In a two-way sensitivity analysis, the intraocular pressure-lowering effect of timolol and latanoprost was investigated.

**Results**
With timolol, the lifetime costs were EUR 3,514 and the years of blindness were 0.0334

With latanoprost, the lifetime costs were EUR 4,397 and the years of blindness were 0.0318.

The incremental cost-effectiveness ratio (ICER), which showed the extra cost per year of vision saved when starting therapy with latanoprost versus starting with timolol, was EUR 536,852.

The ICER was EUR 547,276 in the patient subgroup with initial intraocular pressure of 25mmHg and more than EUR 7 million in those with an initial intraocular pressure of 30mmHg. Lower (but still high) ICERs were observed without discounting.

The sensitivity analysis confirmed the robustness of base case findings. Latanoprost was not cost-effective in any age group considered or when varying other model parameters.

**Authors’ conclusions**
The authors concluded that treatment starting with latanoprost was not cost-effective compared with treatment starting with timolol because of small differences in health benefits and the high price of latanoprost.

**CRD commentary**

**Interventions:**
The selection of the comparators was appropriate as both drugs are widely used for the management of ocular hypertension.

**Effectiveness/benefits:**
Clinical data were taken (when possible) from systematic reviews, which should have included all relevant studies. Treatment effect was taken from meta-analyses that included mainly clinical trials and should ensure high internal validity. Patients’ characteristics were relevant to the authors’ context. Key clinical inputs were varied in the sensitivity analysis.

A disease-specific benefit measure was used. Years of blindness prevented represented a natural outcome of the intraocular pressure-lowering treatments but did not allow comparisons with the benefits of other health care interventions.

**Costs:**
The economic analysis was consistent with the perspective of the analysis. Key details of unit costs and quantities of resources used were reported. Most costs came from official price lists in the Netherlands, so appear appropriate for the analysis. Resources used were from hospital databases and experts’ opinions; they were representative of the Dutch context. Variations in key economic inputs were tested in the sensitivity analyses. The price year was reported, which would allow reflation exercises in other time periods.

**Analysis and results:**
An incremental analysis was appropriately used to combine costs and benefits of the two treatment strategies under examination. A clear description of the simulation model was provided. Uncertainty was investigated appropriately, using both a deterministic approach for key inputs of the model and statistical methods to calculate standard deviations.
for model outcomes. The study results were clearly reported for the base case and the alternative scenarios. Study findings appeared specific to the Dutch context, so it was unclear whether they would be relevant in other settings, although they might be relevant in jurisdictions with similar relative drug prices and epidemiology.

Concluding remarks:
The analysis was based on a valid modelling framework. The authors’ conclusions appear robust.

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