Cost-offset analysis: bimatoprost versus other prostaglandin analogues in open-angle glaucoma

Berenson KL, Kymes S, Hollander DA, Fiscella R, Bark C, Patel VD

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 study assessed the clinical and economic value of bimatoprost, latanoprost, and travoprost for the treatment of primary open-angle glaucoma. The authors concluded that bimatoprost produced the greatest clinical improvement for disease progression, resulting in cost-savings over travoprost and latanoprost from a health care payer perspective. The study used a cost-consequences framework that focused on the economic impact of treatments. Lack of details about clinical sources makes it difficult to judge the validity of the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study assessed glaucomatous progression and costs among primary open-angle glaucoma patients treated with bimatoprost, latanoprost, or travoprost. In particular, the analysis focused on the financial impact of the three drugs in a budget-impact analysis.

Interventions
The three prostaglandin analogue treatments for primary open-angle glaucoma that were compared were bimatoprost, latanoprost, and travoprost. Patients with early glaucoma and advanced glaucoma were considered.

Location/setting
USA/primary and secondary care.

Methods
Analytical approach:
The analysis was based on a Markov cohort model with a seven-year time horizon. The authors stated that the analysis was carried out from the perspective of the payer, such as a managed care organisation.

Effectiveness data:
Clinical inputs were derived from a selection of published studies. The link between disease progression and intraocular pressure was taken from a clinical trial, while primary open-angle glaucoma prevalence was taken from a study that assessed prevalence in several countries, including the USA. Drug efficacy was a key input of the model and was defined on the basis of variations intraocular pressure.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The number of patients who developed visual field or glaucomatous progression over seven years was the main outcome of the model.

Cost data:
The economic analysis included the costs of drugs (with dispensing fees), physician visits, laser trabeculoplasty, visual field tests, and additional glaucoma medications. Prices were calculated using average wholesale prices for drugs and
Medicare reimbursement rates for the other medical items. Rebates and co-pays were taken into account. Costs were in US $. A 3% annual discount rate was applied. The price year was 2008.

Analysis of uncertainty:
One-way sensitivity analyses were carried out on the rate of reduction in risk of disease progression (per 1mmHg change in intraocular pressure) and the price of generic latanoprost.

Results
For long-term progression rates (in a health plan of 100,000 members with 19,000 open-angle glaucoma patients), the number of patients who developed visual field or glaucomatous progression over seven years was 630 if all patients were treated with bimatoprost and 766 if all patients were treated with travoprost or latanoprost.

The delayed or avoided progression of disease led to cost-savings associated with bimatoprost over either alternative medication of $545,224 in the population of early glaucoma and $617,848 in the population with advanced glaucoma.

The budget impact analysis showed that switching from the current market share (22% of patients on bimatoprost, 23% on travoprost and 55% on latanoprost) to different scenarios with more patients on generic latanoprost (0% bimatoprost, 23% travoprost, 77% latanoprost; or 22% bimatoprost, 0% travoprost, 78% latanoprost) would produce small cost-savings for the health maintenance organization.

The sensitivity analysis showed that the cost-savings associated with bimatoprost held regardless of the assumptions on disease progression or cost of generic drug.

Authors' conclusions
The authors concluded that bimatoprost led to the greatest clinical improvement in disease progression, which resulted in cost-savings over travoprost and latanoprost from the perspective of the health care payer.

CRD commentary
Interventions:
The comparators were appropriately selected as they were common medical therapies that had been compared in various clinical trials or meta-analyses at the time of the analysis. The available market shares of prostaglandin analogues were also considered.

Effectiveness/benefits:
A selective approach appeared to have been used to identify relevant sources of evidence. The inputs used in the clinical side of the model were clearly reported, but the authors provided few details on the characteristics of these studies, the types of interventions under examination and the relevant patient population. The lack of these pieces of information reduced the transparency of the clinical analysis and prevented an objective assessment of the validity of the clinical inputs. The authors stated that the treatment effect of the drugs considered was compared in several clinical trials, but no information was provided on which of these studies were selected for the analysis. The direct impact of the treatments on intraocular pressure was the main efficacy parameter. No further beneficial aspect of medications was considered.

Costs:
The economic analysis was a key aspect of the study and was satisfactorily carried out. The cost categories included in the model were consistent, with the perspective stated by the authors. Unit costs were clearly presented for all items; all model assumptions were explicitly stated. Data sources were clearly reported, which enhanced the transparency of the economic side of the analysis. The impact of variations in the price of latanoprost was taken into account as the generic medication entered the US market during the study. The price year was reported, which allowed reflation exercises in other time periods. The authors stated that the cost of side effects was not considered as all drugs were proven to have a similar safety profile.

Analysis and results:
Cost-effectiveness ratios were not explicitly calculated, but the analysis demonstrated the superior clinical and economic profile of one treatment (bimatoprost) over the others. Uncertainty was only partially investigated, as the
sensitivity analyses were restricted to two inputs (rate of reduction in risk of disease progression and price of generic latanoprost); only a deterministic analysis was conducted. The authors acknowledged some limitations of their analysis and stated that some clinical inputs might not fully reflect real-world practice. Detailed results were presented for populations with early or advanced disease. The results appeared to be specific to the authors’ context and would be difficult to transfer to other settings.

Concluding remarks:
This study used a cost-consequences framework that focused mainly on the economic impact of treatments. Lack of details about clinical sources makes it difficult to judge the validity of the authors' conclusions.

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