Costs and effectiveness of travoprost versus a dorzolamide + timolol fixed combination in first-line treatment of glaucoma: analysis conducted on the United Kingdom General Practitioner Research Database

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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 objective was to compare the costs and effectiveness of travoprost versus dorzolamide and timolol. The authors concluded that travoprost dominated dorzolamide and timolol, as it was both more effective and less costly. Although the authors used a retrospective design, the methodology was good and appropriate statistical methods were used to control for biases. The methods and results were well reported and the conclusions appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to compare the costs and effectiveness of travoprost versus a fixed combination of dorzolamide and timolol as first-line therapy for glaucoma.

Interventions
The intervention was travoprost (Travatan, Alcon Laboratories) as first-line therapy for glaucoma. This was compared with dorzolamide plus timolol (Cosopt).

Location/setting
UK/primary care.

Methods
Analytical approach:
The effectiveness and resource use data were derived from the UK General Practitioner Research Database (UK-GPRD), which collected medical information from a representative sample of general practitioners (GPs). The time horizon of the analysis was four years.

Effectiveness data:
The effectiveness data were derived from the UK-GPRD which, according to the authors, was the world's largest computerised database of anonymous longitudinal records in primary care medicine. The treatment groups were compared at baseline on demography, general co-morbidity, and eye co-morbidity. Adjustments were made to control for bias from unbalanced confounding factors of treatment efficacy using propensity scores. Propensity scores were defined as the conditional probability of being treated with a specific treatment according to its observed covariates. A total of 54,513 glaucoma patients were identified in the database and 639 of these received first-line treatment with travoprost and 387 with dorzolamide and timolol. The mean duration of follow-up was significantly longer for the dorzolamide and timolol group (929 days) than for the travoprost group (515 days). The main clinical effectiveness estimate was the treatment failure (see 'Measure of Benefit' below for the definition).

Monetary benefit and utility valuations:
None.

Measure of benefit:
The measure of benefit was treatment failure, which was defined as a prescription change, replacement or
discontinuation of the designated medication, addition of another treatment, laser therapy, or surgery for glaucoma.

Cost data:
Only the glaucoma-specific direct costs were included in the analysis. These included surgery and laser therapy, hospitalisations, medications, GP and specialist visits, and prescription renewals by telephone. The resource use data were derived from the UK-GPRD and the unit costs of medication were taken from the British National Formulary. The unit costs of medical procedures were derived from a published study. Specialist and GP visit data were derived from a compendium of UK unit health care costs. As the duration of follow-up was significantly longer for dorzolamide and timolol, the estimates were adjusted using a regression model. All prices were updated to 2005 using the health service inflation rate. The costs were reported in UK pounds sterling (£) and discounting was not reported.

Analysis of uncertainty:
All the cost, resource use and outcome differences between the two groups were tested using statistical analyses. The continuous variables were compared using a z-test if they were normally distributed and the non-parametric Wilcoxon test if they were not normally distributed. Discontinuous variables were compared using a chi-square test. The significance was set at 5% and times to treatment failure were compared by means of an adjusted Cox model using the propensity score method.

Results
After one year, the hazard rate for failure was significantly lower with travoprost, odds ratio 0.75 (95% CI 0.68 to 0.82) before adjustment. After adjustment for time since diagnosis, general co-morbidities and eye co-morbidities the rate remained significantly lower with travoprost, odds ratio 0.77 (95% CI 0.62 to 0.95).

After adjustment for follow-up, the annual average cost of dorzolamide and timolol was £321.21 compared with £198.31 with travoprost (p<0.001).

The costs and benefits were not combined as travoprost was found to be dominant over dorzolamide and timolol, which means it was both more effective and less costly.

Authors' conclusions
The authors concluded that the results from the UK-GPRD suggested that travoprost dominated dorzolamide and timolol as a first-line treatment for glaucoma.

CRD commentary
Interventions:
Both of the interventions were well reported and both travoprost and dorzolamide plus timolol were shown by the authors, through the results of the UK-GPRD, to be widely used in primary care practice in the UK at the time.

Effectiveness/benefits:
The effectiveness data were derived from a large retrospective cohort study; the UK-GPRD. This design is associated with many potential biases, such as inclusion bias and non-comparability of study groups at baseline. Although these patients were comparable in terms of their age and gender, those in the dorzolamide and timolol group had a longer follow-up (due to an earlier marketing authorisation) and the groups varied significantly in terms of their eye and general co-morbidities. In order to control for these biases, a series of regression analyses were run and adjustments made using propensity scores. These methods were reported in detail and the effectiveness results were reported with and without adjustment.

Costs:
The perspective was well reported and it seems that no major cost categories or costs were excluded for this NHS perspective. The authors appropriately reported how the resource use and unit costs were obtained. As with the effectiveness estimates, the cost differences were adjusted for the non-comparability of groups at baseline, using regression analyses and the results were reported with and without adjustment. As the time horizon was four years, discounting was relevant, but it was not reported.
Analysis and results:
The costs and benefits were not combined as travoprost was found to be dominant. All the differences between groups were adequately tested using appropriate statistical methods and adjustments were made for differences in the patients’ baseline characteristics. Both the methods and results were adequately reported. In their discussion section, the authors highlighted at length the limitations of their analysis, the main one being its retrospective design.

Concluding remarks:
Although the authors used a retrospective design, the methodology was good and statistical methods were used to control for biases. The methods and results were well reported and the conclusions appear to be appropriate.

Funding
Supported by a grant from Alcon France SA, Rueil-Malmaison, France.

Bibliographic details

PubMedID
17958945

DOI
10.1185/030079907X242836

Original Paper URL
http://informahealthcare.com/doi/abs/10.1185/030079907X242836

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Aged; Antihypertensive Agents /economics /therapeutic use; Cloprostenol /analogs & derivatives /economics /therapeutic use; Cost-Benefit Analysis; Databases, Factual; Drug Combinations; Drug Costs; Female; Glaucoma /drug therapy /economics; Great Britain; Humans; Male; Physicians, Family; Sulfonamides /economics /therapeutic use; Thiophenes /economics /therapeutic use; Timolol /economics /therapeutic use; Travoprost

AccessionNumber
22008000181

Date bibliographic record published
03/06/2009

Date abstract record published
09/12/2009