Conjunctival hyperaemia with the use of latanoprost versus other prostaglandin analogues in patients with ocular hypertension or glaucoma: a meta-analysis of randomised clinical trials

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CRD summary
The authors concluded that latanoprost was associated with a lower incidence of conjunctival hyperaemia than travoprost and bimatoprost in patients with ocular hypertension or glaucoma. The review was generally well conducted and the authors’ conclusions appear appropriate.

Authors’ objectives
To compare the rates of conjunctival hyperaemia in patients with ocular hypertension and/or glaucoma treated with latanoprost compared with bimatoprost and travoprost.

Searching
MEDLINE, EMBASE and Cochrane Central Register of Controlled Trials (CENTRAL) were searched from 1995 to April 2007 for English-language articles. Search terms were reported. Reference lists of relevant articles were searched.

Study selection
Randomised controlled trials (RCTs) that compared latanoprost with bimatoprost or travoprost in adult patients with ocular hypertension or glaucoma were eligible for inclusion. Trials had to provide data on conjunctival hyperaemia. Trials with a small sample size or inadequate wash-out period cross-over design were excluded.

The included trials were predominantly parallel with some cross-over designs. All compared latanoprost (0.005% solution) with bimatoprost (0.003% solution) and/or travoprost (0.004% solution) in adult patients. Ages ranged from 58 to 73 years. Patients had open-angle glaucoma, ocular hypertension or other types of glaucoma. Length of follow-up ranged from two weeks to 12 months.

Two authors independently undertook the selection process and disagreements were resolved through discussion.

Assessment of study quality
Study validity was assessed using the Jadad score, which scored eight quality factors that included randomisation, inclusion/exclusion criteria, blinding and withdrawals.

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Data extraction
Data were extracted on incidence of conjunctival hyperaemia over treatment visits and used to calculate odds ratios (OR).

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Methods of synthesis
Pooled odds ratios and 95% confidence intervals (CI) were calculated using fixed-effect and random-effects meta-analysis. Statistical heterogeneity was assessed using $I^2$ and Cochran Q statistics. Sensitivity analysis was performed by eliminating one trial at a time to check the robustness of pooled estimates. Publication bias was assessed using funnel plot visual analysis.
Results of the review
Thirteen RCTs were included in the review (n=2,222 patients). Sample sizes of included trials ranged from 21 patients in a cross-over design to 595 patients in a parallel design trial. Trial quality was generally moderate to good: Jadad scores ranged from 5 to 7 out of 8. There was no evidence of statistical heterogeneity in any of the analyses; fixed-effect and random-effects meta-analyses showed the same results. There was no evidence of publication bias based on a visual inspection of funnel plots.

Latanoprost (0.005% solution) versus travoprost (0.004% solution): There was a statistically significant reduction in the incidence of conjunctival hyperaemia in the latanoprost patients compared with the travoprost patients (OR 0.51, 95% CI 0.39 to 0.67; six trials, n=1,118 patients).

Latanoprost (0.005% solution) versus bimatoprost (0.003% solution): There was a statistically significant reduction in the incidence of conjunctival hyperaemia in the latanoprost patients compared with the bimatoprost patients (OR 0.32, 95% CI 0.24 to 0.42; eight trials, n=1,240 patients).

Sensitivity analyses indicated that the results were robust to removal of single trials; removal of any trial did not change the statistical significance of the results for either comparison.

Authors' conclusions
Latanoprost was associated with a lower incidence of conjunctival hyperaemia than travoprost and bimatoprost in patients with ocular hypertension or glaucoma.

CRD commentary
Inclusion criteria for the review were clearly defined and several relevant sources were searched. The restriction to published literature may have caused relevant unpublished studies to be missed, although assessment of the funnel plots did not indicate any evidence of publication bias. There was potential for language bias as non-English language articles were excluded. Two authors independently performed study selection, data extraction and quality assessment, which reduced risks of error and bias in the review. Validity assessment was undertaken using the eight-point Jadad scale, which indicated the good quality of the included trials, although no further details were provided and this made verification of the quality assessment difficult. Fixed-effect and random-effects meta-analysis were undertaken, which appeared appropriate. Statistical heterogeneity and sensitivity analysis were explored.

Overall the review was generally well conducted and the authors' conclusions appear to be reliably derived.

One author is an employee of Pfizer (the manufacturer of latanoprost) and two other authors had participated on advisory boards for several pharmaceutical companies, which included Pfizer.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice, but they suggested that the results of the review might be useful for determining optimal treatment strategies for individual patients.

Research: The authors stated that more research was needed to determine incidence of conjunctival hyperaemia after use of prostaglandins in the mid- to long-term and in real-world clinical practice.

Funding
No funding was declared.

Bibliographic details
Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.