Economic evaluation of quality-of-life improvement with second-generation antihistamines and montelukast in patients with allergic rhinitis

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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
This study assessed the cost-effectiveness of several second-generation antihistamines (levocetirizine, desloratadine, and fexofenadine) and montelukast for uncomplicated allergic rhinitis, focusing on improvements in quality of life. The authors concluded that levocetirizine was a cost-effective treatment compared with other available prescriptions and it offered meaningful improvements in quality of life. The methods were valid and the study was well reported. The authors' conclusions are appropriate, but the high uncertainty in the findings should be considered.

Type of economic evaluation
Cost-utility analysis

Study objective
This study assessed the cost-effectiveness of several second-generation antihistamines and montelukast for uncomplicated allergic rhinitis, focusing on improvements in the quality of life.

Interventions
The interventions were levocetirizine, desloratadine, fexofenadine, and montelukast.

Location/setting
USA/primary care.

Methods
Analytical approach:
The analysis was based on a decision analytic model with a one-year time horizon. The authors stated that the perspective was that of the third-party payer.

Effectiveness data:
The clinical inputs were identified through a systematic search of the MEDLINE database, plus searches of the reference lists of identified studies. The inclusion criteria were reported and blinded, randomised controlled trials (RCTs) that included monotherapy as the comparator were included. Trials of patients with allergic rhinitis and concomitant asthma were excluded. The key outcome was the quality of life, which was assessed using the Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ). Where data were obtained from more than one trial, they were pooled, and standardised mean differences were calculated to assess the clinical effect of each treatment versus placebo.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The benefit measure was the probability of clinically relevant improvement, which was defined as a 0.5 point reduction from baseline in the marginal RQLQ score.

Cost data:
The economic analysis included the costs of drugs and allergy-related physician office visits. The drug costs were based
on daily average wholesale prices, while those of visits were calculated from a database. The visit costs for levocetirizine were not available from the database and were imputed using regression analysis. The resource use for 90 days of therapy was assumed. All costs were in US dollars ($) and the price year was 2007.

Analysis of uncertainty:
A first-order Monte Carlo simulation was undertaken on the clinical and economic inputs, to generate confidence intervals around the mean values for the outcomes.

Results
The marginal probability of a clinically relevant improvement per 100 patients was 16.1 with levocetirizine, 13.8 with desloratadine, 7.6 with generic or branded fexofenadine, and 8.0 with montelukast. The total costs were $525 with levocetirizine, $575 with desloratadine, $494 with generic fexofenadine, $542 with branded fexofenadine, and $631 with montelukast.

Levocetirizine had the lowest average cost-effectiveness ratio and dominated all the alternatives, as it was more effective and less expensive, except compared with generic fexofenadine, where it had an incremental cost per clinically relevant improvement of $361 (95% CI -1,166 to 3,574).

The Monte Carlo simulation showed wide confidence intervals, determined by relatively small sample sizes and relatively similar effectiveness results.

Authors’ conclusions
The authors concluded that levocetirizine was a cost-effective treatment compared with other available prescriptions for allergic rhinitis and it offered meaningful improvements in quality of life.

CRD commentary
Interventions:
The selection of the comparators was appropriate, as the widely used leukotriene-receptor antagonist montelukast was compared against second-generation antihistamines, including the recently approved levocetirizine. The authors stated that over-the-counter drugs, such as loratadine and cetirizine were not included as they were not relevant to health plan decision makers.

Effectiveness/benefits:
A systematic search of the literature was appropriately carried out to identify the relevant clinical inputs for the model. The method used to calculate the quality of life improvements for the efficacy of each treatment was reported and compared with an alternative method used in other studies. An indirect comparison between treatments was required, with placebo as the common comparator. The sources were RCTs, which are generally considered to be a valid source of evidence due to their methods. The benefit measure was justified by the authors and was clinically relevant, but might be difficult to compare with the benefits of other health care interventions.

Costs:
The categories of costs appear to have been appropriate for the perspective of the third-party payer. No information on the unit costs and resource quantities was provided, limiting the transparency of the analysis. The data were from commonly used US sources and the approach used to derive the costs for levocetirizine was described. The authors noted that the costs for hospitalisations and emergency visits were not included as they were very rare in the population analysed.

Analysis and results:
The results were clearly reported and an incremental approach was appropriately used to synthesise the costs and benefits of the treatments. This approach allowed the identification of the dominant strategy. The Monte Carlo simulation showed the high level of uncertainty in the findings. The authors acknowledged that the main limitation of their analysis was the low number of RCTs found for some drugs, which led to high uncertainty in the cost-effectiveness results.
Concluding remarks:
Overall, the methods were valid and the study was well reported. The authors’ conclusions are appropriate, but the high uncertainty in the findings should be considered.

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